Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Devices for Rapid Machining Require Careful Checking

ACCURATE machining of wearing parts is being given more attention by electric railway shopmen than ever before. This is encouraging, as it shows that the revised standards of machining tolerances made by association committees, together with various recommendations for reducing noise by maintaining closer fits, are receiving consideration by the maintenance departments. One railway reports that its stepping for the bearing fits of armature shafts has been reduced one-half. Where previously $\frac{1}{32}$-in. wear was permitted and then the shaft was turned down $\frac{1}{16}$ in. to the next standard undersized diameter, now but $\frac{1}{64}$-in. wear is allowed and the shafts are reduced in diameter but $\frac{1}{32}$ in. to the next step. This practice not only keeps the fits much closer but results in considerable saving in the amount of metal that is turned off to reduce a shaft bearing to the next size.

On another railway property, in checking the accuracy to which armature bearings were being machined, a somewhat surprising fact was disclosed. The bearings were first finished on the outside and the boring was done with the bearing held in a self-centering chuck. It had been assumed that this insured accurate centering of the bore in relation to the outside fit. The checking disclosed bearings with the inside bore out of center from 0.005 to 0.01 in. A bearing that had just been finished in the chuck was marked so that it could be reinserted in the same position. It was then removed and immediately put back in the chuck. Upon starting the boring bar the tool began a cut of about 0.005 in. on one side of the bore.

Use of the self-centering chuck had reduced the time of machining bearings to about one-third that taken when bearings were held in the three-jaw chuck of the lathe. It permitted a slight misalignment, however, so that the bore was not centered accurately. With the old method the machinist did not depend on the holding device for accurate centering and so each bearing was tested carefully for alignment before the boring operation was started. Too great dependence had been placed on the new chuck and inaccurate machining resulted.

Railway Holds First Place in Automobile Manufacturing Center

MORE automobiles are manufactured in Detroit and its environs than in any other city in the world. The employees of this industry far outnumber those of any other industry in the district. On account of the freight differential, automobiles are somewhat cheaper there than elsewhere. Consequently, the automobile has reached the zenith of its popularity in Detroit. It is the more remarkable, therefore, to find that public transportation vehicles are carrying more than 80 per cent of the city's traffic, as was indicated by a recent investigation made by the Retail Merchants' Association.

Street cars were found to be the most important means of transportation, being used by some 56 per cent of all customers at 27 downtown stores. Buses carried slightly more than 24 per cent, while only about 19 per cent came by private automobile. Details of this traffic count appeared in last week's issue. No marked differences from trends indicated by similar checks in other cities are to be seen in the Detroit figures, nevertheless it is interesting to note that the electric railway holds the place of first importance even in the heart of the automobile manufacturing district.

Pull-In Comparisons Not Always Reliable

DISCUSSION to no avail arises from data relative to pull-in records for the simple reason that a pull-in in one city is not so counted in another. Then, too, some companies eliminate from the record pull-ins due to service causes such as broken windows, minor damage because of collision, etc. Master mechanics on other properties that are doing a good job of maintenance may have their records subjected to an invidious comparison because of their companies' policy of counting all pull-ins, whatever the cause, as a basis for determining the pull-in records.

At the meeting of the Iowa operators in Omaha last month the question of car-miles per pull-in was often referred to, the values, however, varying from a few thousand to 20,000. Last summer at the Chattanooga meeting of the Southern Properties' equipment men records of car-miles per pull-in were reported and published in the JOURNAL varying from 5,000 up to 98,000. It seems reasonable to suppose that the methods of determining pull-ins must vary widely in order to obtain such different results.

Comparative records are always of value when made on the same basis. When such a basis does not exist such records are worse than useless. It is far from a simple matter to determine a standard basis for counting pull-ins. On some properties cars are turned in for the slightest failure, while on others repair men fix damaged parts on the road. This difference may even exist on various divisions of the same property. There is also considerable variation due to the character and condition of the equipment and the type of service in which it is used. Old cars manifestly will be expected to give more trouble than new ones. Four-motor cars would be expected to develop more defects than two-motor cars. Such differences as these are

This is the issue in December that is devoted essentially to maintenance and construction subjects

likely to overshadow variations in operation by the individual motormen.

For determination of the total record there is some background of opinion for counting every pull-in without reference to cause. These pull-ins can be analyzed to determine those arising from traffic accidents, shop failures or inspection failures. Even on this basis there will be some difficulty in determining a standard, although if no attempt be made to use the figures as a means of discipline much valuable information may be obtained from them.

Robbing Peter to Pay Paul Is an Expensive Proposition

FEW will deny that a broad and intelligent program of improvement in shop practice must carry with it an equally comprehensive modernization of shop equipment. But, having agreed on this central thesis, any given number of individuals will at once split asunder upon the rock of accomplishment. Those there will be who favor encouraging the local inventive talent to be found within the ranks of their own shop forces—in other words, the home manufacture of machines and devices which are at all within the range of the shop equipment at hand.

Some almost uncanny fascination seems to invest this doctrine of self-sufficiency; it grows upon one. Soon the shop superintendent who started out to build a machine or two for some specific purpose will find himself exercising much ingenuity in devising equipment which at best will accomplish nothing more than any one of a number of machines already on the market. This is assuredly left-handed economy. By far the greater number of progressive mechanical men recognize it as such. Yet in an astonishing number of shops throughout the country one finds the "home-made prodigies" continuing to blossom out with distressing frequency.

Shop forces and shop equipment have certain inalienable duties to perform. Their existence is justified only on the score of their ability to keep the rolling stock in a condition as efficient as possible. Diverted into channels of competition with established equipment manufacturers, they are shooting far from the mark. True, there are isolated instances where a special type of machine has been needed to accomplish a certain function and where such a machine has not been available, nor have there been sufficient funds at hand to purchase it. Here the home-made device has played a valuable rôle. It should be obvious, but apparently is not, that local talent cannot hope to turn out equipment for standard purposes that will function as efficiently as machines which have been produced by manufacturers after large sums have been expended in research and development work.

It should be possible to determine quite accurately the economies which the introduction of new shop equipment will effect in any given service. Minute operating data have been compiled by the manufacturers and are available to railway executives. These, in comparison with records which are generally kept on existing machines, will give the desired information. On the other hand, it can scarcely be determined in advance whether a contemplated piece of home-made equipment will actually save money, or simply will serve to gratify the ego of its proud inventor.

$10 for Improved Car Appearance May Result in $100 Increased Income

FROM the animated discussion given to the subject of improving car appearance at the recent meeting of the rolling stock committee of the American Electric Railway Engineering Association it is evident that increased attention is being given to car cleaning and painting methods. The general opinion expressed was that cars can be painted much more cheaply if the work is done at frequent intervals and that the added attractiveness of cars which results from frequent painting increases car riding to a marked extent.

As an example of what can be done through shortening painting intervals one superintendent of equipment stated that from 1923 to 1925 his company has increased the number of revenue cars painted annually from 33 per cent to 82 per cent of the total and at the same time the cost of painting has been reduced 75 per cent. Cars on this system are now painted every ten to twelve months. Of course not all of this decrease in painting cost is the result of more frequent painting. The painting system has been changed, the number of coats has been reduced, the spray is used wherever possible instead of the brush method, a simplified color scheme has been adopted and the schedule of painting operations has been standardized. However, the decreased time between paintings has made it possible to use more economical painting methods and still keep the cars in a more attractive condition.

Improved car cleaning methods help to keep the painted surface in good condition. Certainly there is no feature that will add more to the appearance of car interiors than cleanliness. Spray washing and high pressure washing are being used more extensively than ever before. By giving particular attention to car cleaning problems cars are cleaned now at much shorter intervals without increasing the total cleaning cost. Many railways clean their cars thoroughly every night, while there is a periodical cleaning once a month, at which time particular attention is given to upholstered seats and parts that are somewhat inaccessible.

It thus appears that a considerable increase in attractiveness of cars can be produced without an increase in maintenance costs. Certainly the added revenue that is sure to result will warrant expenditure of modest sums for more modern painting and cleaning equipment. Added attractiveness to cars will aid materially in winning back former patronage and the visual invitation of clean, well-painted cars will create an instinctive desire to ride.

What Are Our Future Equipment Executives Doing Today?

HOW may we gain recruits for our equipment forces —particularly from among the younger generation who later must provide the group from which the equipment executives of the future will be selected? This is indeed a problem which is facing not only electric and steam railroad companies, but many industrial organizations as well.

With the present general prosperity, all evidence goes to show greatly increased desire for higher education among the youth of the country, with consequent later inclination toward "white-collar" jobs, in spite of the fact that the average mechanic of today makes considerably more money than the average clerk. Social

conditions, therefore, are tending, probably more than in the past, to reduce the quota of young men, both of high school and of college education, who turn to mechanical pursuits as a life career.

Electric railways are intimately concerned with this fact, not only because of the constantly increasing need for better men and better minds to cope with the ever-increasing engineering problems in the electric railway industry, but because equipment work furnishes one of the very best training schools for the offices of president, vice-president and general manager on an electric railway system. This may seem strange to some, but the fact is, the equipment department has been the training school of many of the most successful operating railway executives—both steam and electric—of the present day. A man who has had this training has a knowledge of the fundamental mechanical principles of railway operation that he who has not been actively associated with the equipment department hardly, if ever, is able to acquire. This basic knowledge of the tools which a railway has to use in its daily service—cars, track and power—stands the mechanically trained executive in good stead when he has to pass on those questions of labor and finance which are concerned with daily car and train operation.

A Remedy for Congestion Is Known, but Courage Is Lacking to Apply It

CONGESTION of traffic exists today in the streets of many of our large cities because the municipal authorities do not dare take the steps necessary to afford relief. This was brought out clearly at the December meeting of the A.E.R.A. Metropolitan Section. General agreement that automobile parking is the chief cause of congestion was expressed by the deputy chief inspector in charge of the traffic division of the New York Police Department, by the vice-president of one of the principal street railways in the city and by an executive of a large department store. Notwithstanding this unanimity of opinion as to the cause of the trouble, there was no intimation that action would be taken to relieve the situation.

Many thoughtful retail merchants in New York and elsewhere are awaking to the possibility of decentralization. Because of the difficulty of reaching the downtown shopping district, business is steadily slipping away to the neighborhood stores. These downtown merchants realize that for every customer accommodated by liberal parking rules a dozen, or a score, or hundreds are inconvenienced. They see that the salvation of the big stores lies in the efficient operation of public transportation systems which are used by the large majority of their customers.

The surface transportation systems, which carry 40 per cent of the total traffic in New York City, cannot function efficiently when anywhere from a quarter to a half of the available roadway space is devoted to parking. There is not sufficient room left for moving vehicles. Yet his Majesty the automobilist continues to be allowed to do as he pleases about obstructing the street.

From the remarks of the deputy chief inspector it appears that the evils of present conditions are well understood by the Police Department. But the police are powerless to do anything about it. "Unless help comes from some source, and comes quickly," the inspector said, "we will see traffic completely tied up in certain parts of this city." What a confession to come from the head of the traffic division of the largest city in the United States! The seriousness of the situation is recognized, the remedy is known, but the municipal authorities have not the courage to put it into effect.

Political Bungling Jeopardizes Chicago's Transportation

EVENTS in the Chicago situation have been moving so rapidly in recent weeks that it is difficult to predict what the next development will be. One thing, however, stands out and characterizes the entire series of proceedings. No cleaner-cut example of political inefficiency can be found than in the present Chicago transit situation. Here is a group of companies comprising the largest surface lines system in the world. It has continued to rise in the very face of expiring franchises and maturing bonds, to the highest state of perfection in its history.

Despite the political situation, the service has been improved by the purchase of 445 new cars within the last four years. The companies under the operating agency of the Chicago Surface Lines have shown progressiveness in modernization programs that have relieved traffic congestion in the famous Chicago Loop, and otherwise have rendered a service generally proclaimed to be the best in the country. Both earnings and wages have been increased, and instead of allowing an atmosphere of discouragement and despair to prevail, the business has been conducted in an orderly manner and with that quiet efficiency that has met with the popular approval of the patrons served.

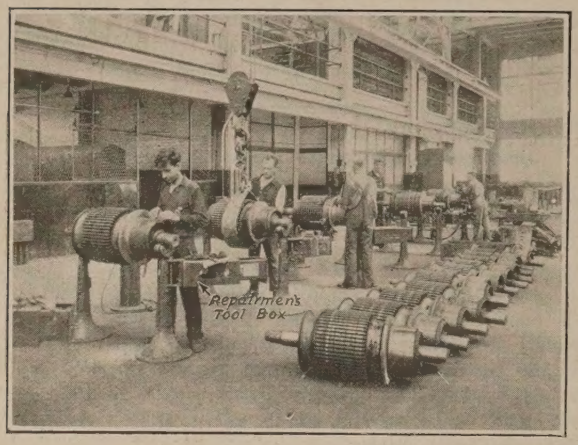
In fact, all of the elements necessary for adequate transportation are within easy reach. Only the handicap of expiring franchises hampers the economic growth of this great group of properties. Capital and management have done their best; but the evils of the short-term franchise, with the management harassed by self-seeking politicians, threaten the continuance of this valuable public service.

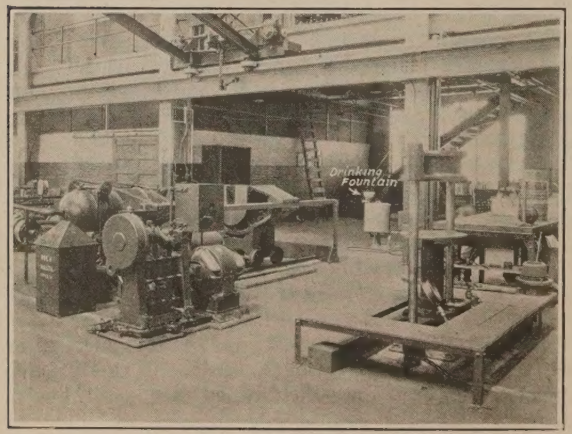
The city of Chicago has not shown a lack of interest in the situation. Many reports have been made, much testimony has been listened to, innumerable committees have been appointed. By referendum vote two proposed solutions of the difficulties have been defeated. The fact remains, however, that Chicago to-day is without a plan of settlement, and the franchises have but one month to run in the coming year. With their expiration the underlying bonds fall due with no basis on which to refinance. So also the agreement of joint management of the four underlying companies comes to an end.

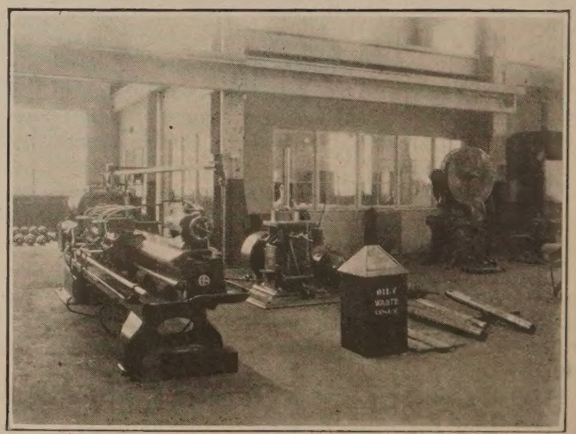
It is useless to predict the future. The protection of the courts has been invoked. That is only a temporary expedient. Whether or not a plan can be worked out depends on co-operation by the city and a change in attitude, not yet in evidence. At best the management and capital that performed with such faith the service so necessary to Chicagoans will be jeopardized.

The real contribution that makes for success or failure is one of management. Any one can provide transportation, but only the trained management with adequate protected capital can provide the kind of transportation that will meet with success in present day life. Certainly justice and common sense alike demand the support of operators who have had a record of accomplishment like those in Chicago.

The Central Bay of the B.-M. T. Electrical Repair Shop and Four Departments in It







The four small pictures show close-ups in the corresponding corners of the bay, which is spanned by a 5-ton traveling crane and two traveling wall jib cranes. Upper left—Armature core and commutator repair department. Upper right—Armature winding; outlets for gas, compressed air and testing current are provided. Lower left—Horizontal and vertical hydraulic presses for forcing operations. Lower right—Modern axle lathe, vertical key seater and punch press, superintendent's office.

Progressive Routing of Work Features New B.-M.T. Shop

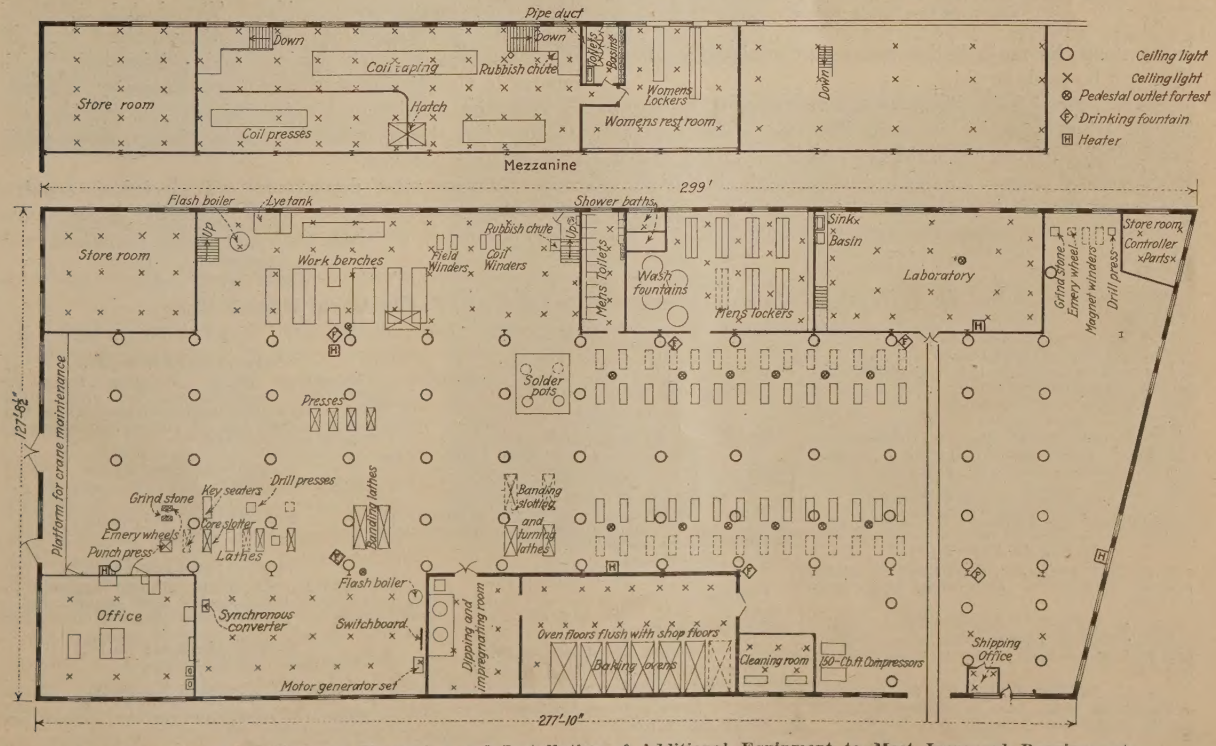
FIRST ARTICLE

The Electrical Repair Building Is the First of the New Coney Island Repair Shops to Be Used by the Rapid Transit Division of the Brooklyn-Manhattan Transit Corporation — Ultra-Modern Equipment Installed for Making Repairs Quickly and Efficiently

CAREFULLY fitted out with the latest types of machine tools and other equipment needed for electrical repairs, the first unit of the new Coney Island repair shops of the Brooklyn-Manhattan Transit Corporation is in use. When completed the entire group will form the largest and best equipped electric railway inspection and repair shops in the world. Seven buildings are now in the course of erection, with a total floor area of nearly 13 acres. They comprise a main repair shop, an inspection shop, the electrical repair shop, which is the subject of this article; a two-story storehouse, a two-story office building, an oil house, and a boiler house. The total floor area of the seven buildings is 546,000 sq.ft.

The buildings themselves are being built by the city of New York under subway contract No. 4, while the railway company provides the equipment, including heating, lighting, power, machine tools, cranes, elevators, etc. The building now used for the department of electrical repairs is the first one to be completed and the city is now proceeding with the construction of the remainder of this comprehensive group of repair and inspection shops. The yards for these shops occupy the entire space between the Sea Beach and Culver lines of the railway at Avenue X and extend south to Coney Island Creek. The electrical repair shop occupies the northeast corner of this area immediately adjacent to the Avenue X station of the Culver line and but a short distance from the 86th Street station of the Sea Beach line. The shop building is 300 ft. long and 127 ft. wide. The central portion is open from floor to roof and a mezzanine floor 32 ft. wide extends along one side of the building with a space for a similar mezzanine to be built later on the opposite side. Particular attention has been devoted to providing large central sawtooth skylights and an unusual amount of wall space for windows so as to make the interior of the shop exceptionally light throughout the daylight hours and a most attractive place in which to work.

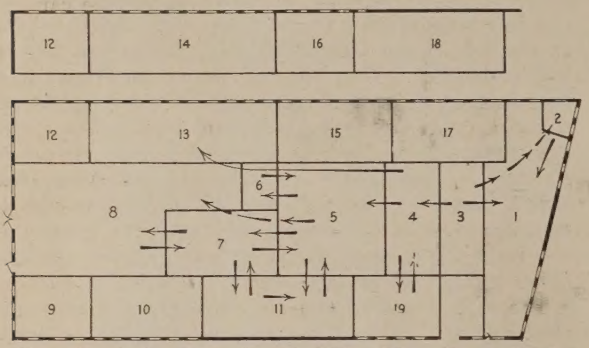
The framework of the electrical repair shop is of steel and the walls of tapestry brick with a concrete foundation. The building presents a very pleasing



Provision Has Been Made for Expansion and Installation of Additional Equipment to Meet Increased Requirements. The Equipment Indicated by Means of Dots Has Not Been Installed

appearance with little attempt at ornamentation. The coping is of terra cotta and window sills are Rowlock brick. Windows are all fitted with steel sash. Ventilating panels in the exterior steel sash are glazed with ¼-in. rough wire glass. Other glazing in the first story is ¼-in. rough glass and the second story exterior steel sash is glazed with clear glass except in the ventilating panels. Roof lights are glazed with ¼-in. rough wire glass. The roof over the center bay is of sawtooth design which furnishes abundance of interior light. The backs of the sawtooth section are of precast interlocking cement tile with glass inserts. The roof over the mezzanine floor and side bay is built of concrete slabs on steel with asphalt surfacing. The floor of the mezzanine section is of cement with an asphalt finish. The ground floor is of Carter Bloxonend flooring on a concrete base.

Unit heaters are located at intervals around the shop and wall radiators where required in rooms, etc. The heating system is of low-pressure type with vacuum return, steam at about 5 lb. pressure being used. Steam is now supplied from a temporary boiler, but as soon as the main boiler house is completed connection will be made to this.

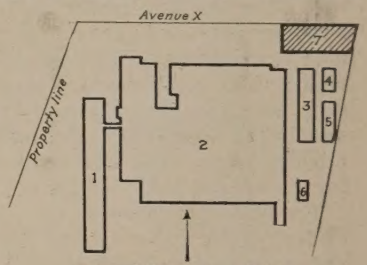


Departments Are Grouped so that Work Moves Progressively. Operations Performed in the Various Sections Are Given in the Table Below

All electric lighting fixtures are arranged to conform to the latest practice in shop lighting. The central bay is lighted from five-light clusters about 30 ft. above the floor and spaced on 20-ft. centers, each cluster consisting of five 94-watt lamps with porcelain reflectors. Side bays are supplied from single 94-watt lamps 10 ft. above the floor, with porcelain reflectors spaced on 8-ft. by 10-ft. centers. In the washroom and locker rooms 56-watt lamps are used. There are also separate circuits for watchmen's lights, fire apparatus, fire alarm and hydrant designation lights. The 600-volt direct-current system of the railway is used for lighting, five lamps being connected in series across the line.

All wire is run in conduit in the ceilings, floors and walls with pull boxes at convenient intervals. A general lighting and power switchboard is located on the south balcony of the shop. From this the circuits run to separate lighting and power panels at convenient points in the shop. These control panels are provided with Westinghouse safety switches mounted in steel cabinets with hinged doors.

Pipe trenches are provided for the distribution pipes for steam, air, gas, electricity and water. Pedestals are placed along each side of the central section of the shop devoted to stripping and winding of armatures. These pedestals include connections for gas, air at 90 lb. pressure and electricity at 110 volts a.c. and 600 volts d.c. Some further details as to the construction of these stands and the convenience for various classes of work will be given in connection with the shop equipment.



General Layout of Shops

The department of electrical repairs, shown as No. 7, is the first building completed. Others in the group are: 1, Inspection shop. 2, Main repair shop. 3, Storehouse. 4, Office. 5, Oil house. 6, Boiler house.

Electric railway maintenance men will find the new electrical repair shop of the Brooklyn-Manhattan Transit Corporation of particular interest because of the modern equipment provided. The shop is arranged to handle the largest as well as the smallest item of electrical repair work rapidly and efficiently. Quick repairs to electric car equipment are necessary, not only to keep the maximum number of cars in service continually, but also to minimize the number of spare parts that must be stocked.

In planning the department of electrical repairs, particular attention was given to grouping departments and equipment so that the part being repaired will

Schedule of Work in Various Departments of B.-M.T. Electrical Repair Shop

(Figures after section numbers are approximate areas)

Section 1—3,480 Sq.Ft.
For repairs to controller equipment, contactor boxes, switch groups, line switches, magnets and door equipment.

Section 2—277 Sq.Ft.
Control storeroom. Material necessary for repair parts made up in Section No. 1.

Section 3—2,093 Sq.Ft.
Shipping department.

Section 4—1,798 Sq.Ft.
Armature stripping department. Stripping of armatures. Rewinding and repair of coils.

Section 5—3,306 Sq.Ft.
Rewinding of heavy armatures. Soldering and banding of armatures previous to baking.

Section 6—450 Sq.Ft.
Soldering pots. All armature windings above 10 hp. are dipped.

Section 7—1,944 Sq.Ft.
Banding department. Armature banders. Armatures cleaned and slotted.

Section 8—5,466 Sq.Ft.
Machine shop.

Section 9—1,287 Sq.Ft.
Shop offices.

Section 10—1,980 Sq.Ft.
Testing department. Motors and control equipment are tested with high potential apparatus and certain types are given an actual running test.

Section 11—2,040 Sq.Ft.
Dipping and baking room. Impregnating tanks for field coils and all dipping and baking requirements.

Section 12—2,500 Sq.Ft.
Storeroom for insulating material, wire and complete coils.

Section 13—3,170 Sq.Ft.
Field coil work.

Section 14—3,170 Sq.Ft.
Mezzanine floor. Winding room for armatures, magnets and all other small coils, steam coil presses installed so that armature coils can be completed except for dipping and baking.

Section 15—1,920 Sq.Ft.
Men's room.

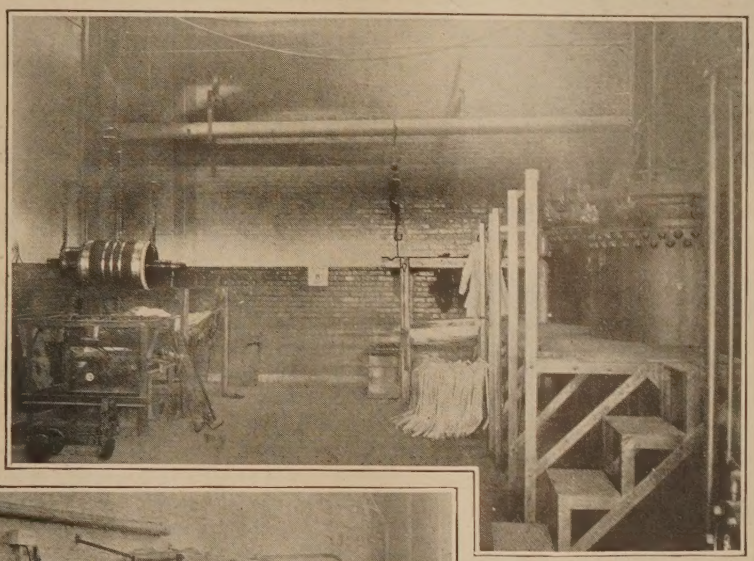
Section 16—1,280 Sq.Ft.
Women's room.

Section 17—1,920 Sq.Ft.
Laboratory. Tests of all material for electrical, maintenance and general repair shops for physical and chemical properties.

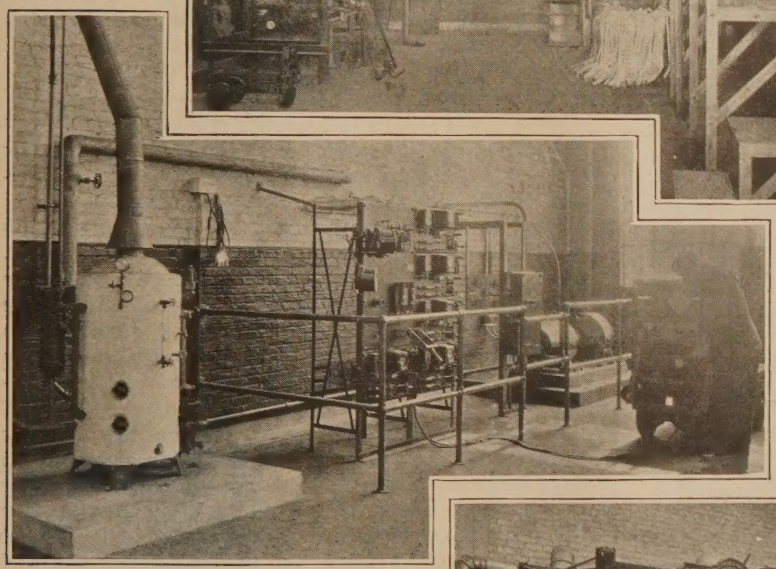
Section 18—2,528 Sq.Ft.
Storeroom for laboratory.

Section 19—1,490 Sq.Ft.
Cleaning room for various motors and control before dismantling.

move progressively from one operation to the next and all interference, cross-routing and back-tracking of parts will be eliminated. Provision for expansion and installation of equipment to meet future increased requirements has been made. Plenty of space has been left around machine tools so that equipment can be handled efficiently without interference. Speed in making repairs with an economical shop force has been sought. Quick movement of heavy parts is taken care of by a 5-ton Box traveling crane which spans the central bay and traverses its entire length, by two 1½-ton Box traveling wall jib cranes, operated from the floor, and by several small storage-battery trucks. The wall jib cranes serve the machine tools so that the traveling crane can be used for longer movements and for placing material conveniently to machines.



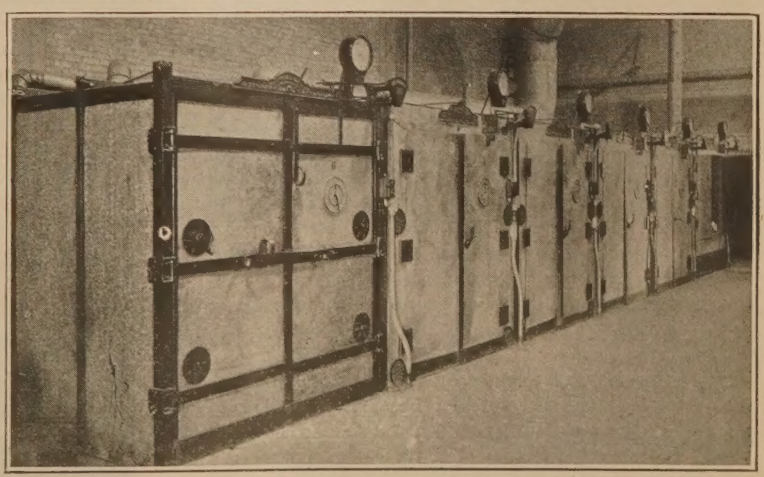
Equipment for Rolling Armatures in Insulating Varnish Is Shown at the Left and the Impregnating and Mixing Tanks at the Right



The Flash Boiler at the Left Supplies Steam for the Impregnating Room—Batteries of Shop Trucks Are Charged from a Motor-Generator Set with Convenient Switchboard Shown in the Center

An accompanying plan shows the shop divided into sections so as to illustrate the efficient manner in which work of similar character is grouped. A table lists the work done in each section. Lines with arrows show progressive movement of parts during repairs.

Section 3, with a track over which cars can be brought into the shop, is used for the receipt and shipping of all equipment and material. Armatures, the repair of which constitutes a large part of the work done at this shop, are inspected as they are received and are divided into two general classes—first, those that require complete rewinding, and, second, those that can be repaired without rewinding. All armatures are moved into section 4 by cranes or trucks and are placed on adjustable stands manufactured by the Columbia Machine Works. These have a large steel bell-shaped base with roller-bearing cradles at the top. Two such stands support an armature. One is bolted securely to the floor, while the other is left free to be moved so that adjustment can be made to take care of various lengths. The head with the cradle has a screw bottom with square threads to provide a 10-in. height adjustment. A convenient height used for repair of armatures is with the roller bearings 36 in. above the floor level. In grouping the stands, the stationary ones are spaced 6 ft. apart. A winder's tool box and material stand of sheet steel is attached by hinged supports to the stationary armature stand. This is 15 in. wide, 18 in. long and 8 in. deep. It is provided with a sheet-steel drawer which can be locked. Space is provided in the armature repair section for a double row of winding stands on either side. But one row on each side is in use at the present time.



Automatically Controlled Drying and Baking Ovens Are Important Parts of the Equipment

The armature rewinding and repair section is provided with twelve outlet pedestals. To these are brought pipes containing gas and compressed air and

Short Circuits or Grounds Inside or at the Rear End of Commutators Are Repaired at the Bench

the conduit with wires for connection to both alternating and direct-current supply sources. Each pedestal has an upright circular steel base of 8 in. diameter and 29 in. high with a cast steel bottom. On top of the pedestal is mounted a square outlet box, 8½ in. x 8½ in. x 4 in. deep. The four sides are provided with proper fittings so that connection can be made quickly for gas, air, direct current and alternating current. Small brass plates on top of the cover indicate to the workman just which connection is to be used for each supply. There are six of these outlet pedestals, spaced 12 ft. apart, on each side of the armature rewinding and repair section.

Three soldering furnaces mounted permanently alongside the winding stands are used to heat irons for soldering the rear ends of some types of armature windings which cannot be dipped for soldering. Each soldering furnace has a gas connection and burner of sufficient size so that two soldering irons can be heated at one time. The furnaces are made by Charles A. Horn. They are mounted on a strap-iron stand which brings the furnace 2 ft. above the floor.

A Special Room for Cleaning

Armatures sent in for repairs usually need rebanding or new mica V-rings. Some single coils are replaced. If it is evident that an armature can be repaired without rewinding, it is sent to the cleaning room before dismantling. This room, shown as section 19 on the accompanying plan, is 19 ft. 6 in. x 14 ft. 9 in. and has two galvanized iron housings, 3 ft. x 3 ft. x 5 ft. long, into which the largest size railway armature as it rests on a truck can be rolled and be closed in completely during the cleaning operation.

Dust and grease caked solidly are loosened by scraping. Compressed air is played on the armature and a vacuum system sucks away all loose particles. The two receptacles are connected by 12-in. diameter pipes to a 16-in. diameter vertical pipe. The pipe from each receptacle has a damper so that one can be shut off while the other is in use. A hinged door the full size of the front of each receptacle is provided and to support the door as it is being opened a castor is fastened to the bottom corner farthest from the hinged side. The large front door is also provided with a small circular 15-in. door, and there is also a similar circular door in the opposite end of the receptacle. Another rectangular door 12 in. x 36 in. is provided in the side. These openings are for inserting the nozzle of an air hose to blow out the armatures. These cleaning

Machine Tool Equipment in Shop Devoted to Electrical Repairs for B.-M. T. System

One 26-in. lathe, Monarch Machine Tool Company.

One Peerless universal slotting, banding and commutator turning lathe.

Two Le Courtenay Company's banding and slotting lathes.

One Peerless slotting and banding lathe.

One banding tension machine.

One 15-in. lathe, Sebastian Lathe Company.

Two drill presses, W. F. & John Barnes Drill Press Company.

One commutator slotter, Electric Service Supplies Company.

One 8-in. Lo-Swing lathe.

One No. 3 Little Giant horizontal key seater, Mitts & Merrill.

One No. 5 Little Giant vertical key seater, Mitts & Merrill.

One punch and shear, Ferracute Machine Company.

One double-spindle grinder, Ransom Manufacturing Company.

Two motor-driven grindstones.

One 200-ton horizontal press, Hydraulic Press Manufacturing Company.

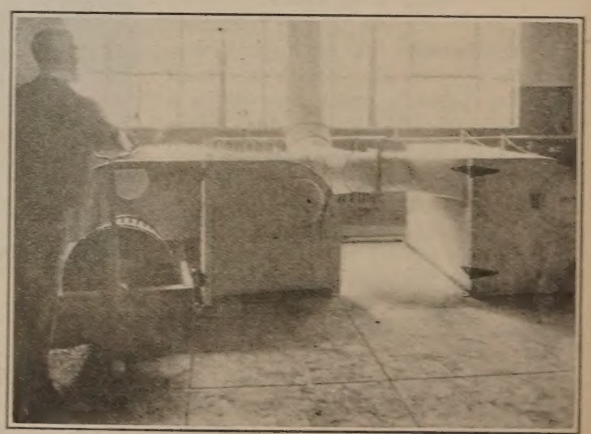
One 50-ton vertical press, Watson Stillman Company.

One 60-ton horizontal press.

receptacles are also used for cleaning numerous parts of electric car equipment, such as motor parts, controllers and the like.

Suction to remove the dust and loose particles is provided by a motor-driven fan mounted on the balcony, which serves as a roof for the cleaning room. The refuse material is drawn from the receptacles up through the vertical pipe to a Cyclone separator, in which large particles and any heavy material drop down and through an 8-in. pipe to a steel drum 24 in. diameter by 3 ft. high, which is placed in one corner of the cleaning room. The hood from the pipe fits over the top of the steel drum and is held in close contact by a large steel ring so that there is no tendency for the dirt to fly about the room. The top of the Cyclone separator is connected by a large pipe to a large dust chamber. Light particles are drawn through this and to the exhaust side of the fan, where they are blown outside the building.

After cleaning, armatures which are to be repaired are tested at 1,400 volts a.c. with a Westinghouse por-



The Cleaning Room Has Two Large Galvanized Iron Housings Into Which Armatures on Trucks Are Rolled for Cleaning

table transformer box which is arranged to give testing voltages up to 6,000 in steps of 200. The box is brought to the armature to be tested.

Repairing and Rewinding Armatures

With all coils removed, the armature core is repaired. Any sharp corners or rough edges in the slots that might cause damage to the coils are filed and the slots are cleaned carefully to receive the insulating material for the core. The armatures are next moved to section 5 and the commutators are tested with 3,000 volts to ground and 550 volts between bars. Where repairs to the commutator are necessary these are made and the commutator is tightened carefully. Should there be short circuits or grounds inside or at the rear end which cannot be repaired properly with the commutator in place it is pressed off. This is done in section 8. A 200-ton horizontal-hydraulic press made by the Hydraulic Press Manufacturing Company and a Watson-Stillman vertical press of 50 tons capacity do most of this work. A 60-ton horizontal hydraulic press is used for tightening collars, putting tension on commutators while the nuts are tightened and for removing pinions. These presses are also used for pressing shafts in and out and other forcing operations.

Repairs to commutators removed from the armatures are made in section 13. Unless a commutator is in very bad condition it is the practice to replace the same one on an armature. The armature under repairs is set aside meanwhile. With the commutator again in place, the armature is brought back to section 5 for rewinding.

To show the particular uses to which the various pieces of equipment are put in the department of electrical repairs would require a detailed description of each maintenance operation. The principal repairs made to an armature, however, will illustrate the need for much of the equipment. While armature repairs constitute a large part of the work done, the different steps in rewinding and the order in which the work is completed differ somewhat with the various types of armatures. For a large Westinghouse type 300 armature rewinding operations are as follows:

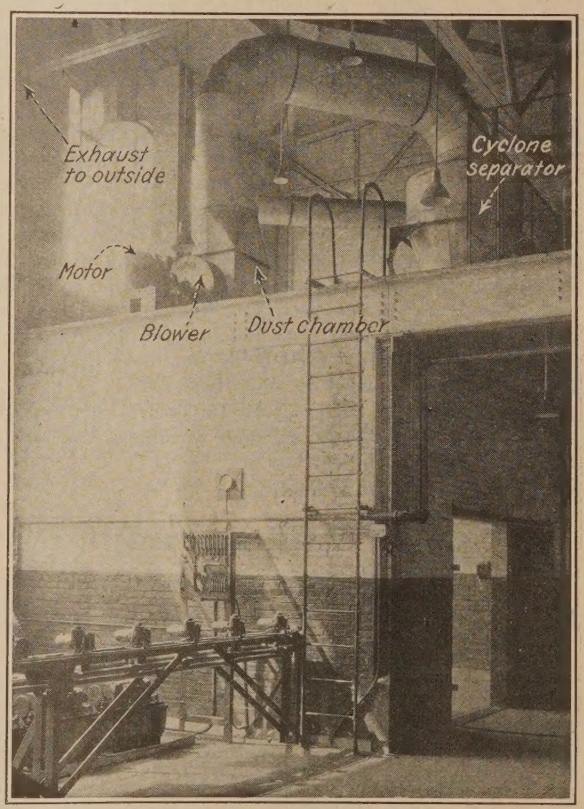
Armature Repair Work Outlined

The winder puts in the bottom coils and tapes them down to hold them in position, properly lined up. The armature is then placed in one of the baking ovens for two or three hours, in order to heat it up. Sticks are then put in on top of the coils and temporary bands are applied while the armature and coils are hot. After cooling, the armature is again placed on a stand in the winding section. The winder cuts the temporary bands and removes them, together with the sticks. Insulation is then inserted above the bottom coils and the top coils are placed in position. The armature then goes into the oven a second time for heating up and again sticks are placed over the coils and temporary bands force the coils down into position. When cold, the armature is again placed on stands and the temporary bands are cut and the sticks taken out. The winder then does the finishing work on the armature and it is given a buzzer test. The armature then goes to the solder pot for the dipping to solder the leads into the commutator neck. After a bar-to-bar test permanent bands are put on and the armature is again submitted to a buzzer test. If this latter test shows trouble in the winding, a bar-to-bar test is made to locate definitely the point of trouble.

The armature then goes into one of the lathes for turning and slotting the commutator. The slots are raked out and the commutator is polished. The armature then is sandpapered and another buzzer test is given it. The core of the armature is then painted and the tape band is given its final coat of varnish. A pinion key is put in the armature shaft and the pinion nut applied. The armature is then ready for service.

Drying and Baking Ovens Important Pieces of Equipment

From the foregoing outline it will be seen that drying and baking ovens are used extensively. These are located in a separate room in section 11, adjacent to which is another room with a complete dipping and impregnating installation. At present six ovens have been installed and there is space for an additional one when the volume of work demands it. Five of the ovens are 10 ft. x 6 ft. 6 in. x 6 ft. high. Their floors are arranged to come flush with the shop floor so that trucks can be rolled directly inside. A sixth oven is arranged for baking coils and small parts. It is 6 ft. x 5 ft. x 34 in. in size. The opening in this oven does not extend to the floor. This oven, together with four of the others, is of Gehnrich Indirect Heat Company's type. The sixth oven, formerly used at the railway's 52d Street shop, was made by the Oven Equipment & Manufacturing Company. The heating and control equipment for all of the ovens was furnished by the Westinghouse Electric & Manufacturing Company. The control boxes are installed on an angle iron framework along the wall



A Motor-Driven Fan and Cyclone Separator Mounted Above the Cleaning Room Remove All Dust and Loose Material

of the oven room, directly in front of the ovens. A regulator, used in connection with an indicating and recording meter which is set for definite temperature limits, gives automatic heat control and eliminates the personal element.

The impregnating room has a mixing tank and an impregnating tank, supplied by the P. J. Devine Company, also equipment for dipping armatures by the rolling method and a very complete overhead I-beam hoist system for handling heavy pieces of equipment. Steam at 60-lb. pressure for heating the compound is furnished by a 4-hp. flash boiler made by P. M. Lattner Manufacturing Company. The mixing and vacuum tanks are jacketed for the steam. No pipes are in sight to become covered with compound and make cleaning difficult. The compound is heated in the mixing tank and a partial vacuum is obtained in the impregnating tank by means of air pumps. The equipment to be impregnated is then subjected to a 28-in. vacuum before the impregnating compound is admitted.

With the compound properly heated and mixed, the valve between the two tanks is opened and the compound runs into the impregnating tank. Peepholes in the top covers of these tanks permit the operator to watch the compound as it rises and shut off the valve when the equipment has been covered over to a depth of from 18 in. to 24 in. After closing the communicating valve the vacuum is relieved and air pressure is supplied by the shop air compressor at from 50 to 55 lb. Compressed air is also used in forcing the compound out of the impregnating tank and into the mixing tank, the maximum pressure used being not more than 5 lb. The vacuum tank used in this installation is 36 in. diameter by 56 in. deep. Both tanks are surrounded by an elevated platform so that workmen can reach all parts without difficulty.

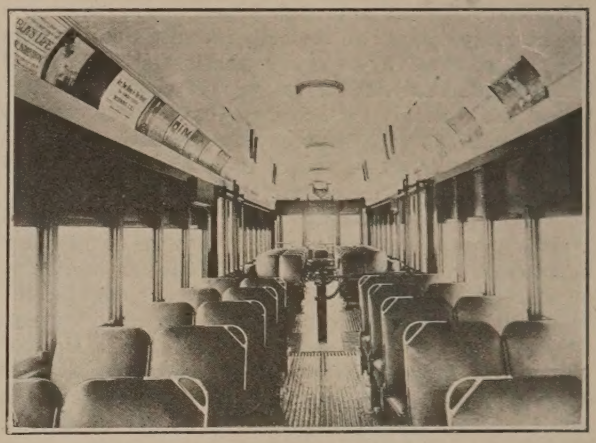
Lehigh Valley Transit Modernizes Cars

Interior of One City and One Interurban Car Remodeled to Increase Comfort and Attractiveness —New Seats, Improved Lighting and Pleasing Decorative Scheme Adopted

HAVING faith in the future of trolley transportation within the city of Allentown, Pa., and the surrounding communities, together with a desire to exploit an idea of making the interior of cars more comfortable and attractive induced the Lehigh Valley Transit Company to remodel the interior of two of its cars.

The interior of the chair car which operates between Allentown and Philadelphia was completely renovated. The bell cord traversing the center of the car, which always presented a rather unpleasant appearance, was moved to the side and the many individual ceiling lamps were replaced with five 94-watt compensating dome lights giving a softer and more even light distribution. The compensating panel is located neatly and conveniently in the bulkhead. The fixed fiber chairs were removed and more comfortable green plush upholstered revolving chairs were substituted in the main section, as well as comfortable genuine leather upholstered swiveling chairs in the smoking compartment. A floor covering of green plush carpet with a center runner of Kemi-suede and an interior finish of walnut grain with buff headlining blend with the upholstery and create an atmosphere of attractiveness and cleanliness.

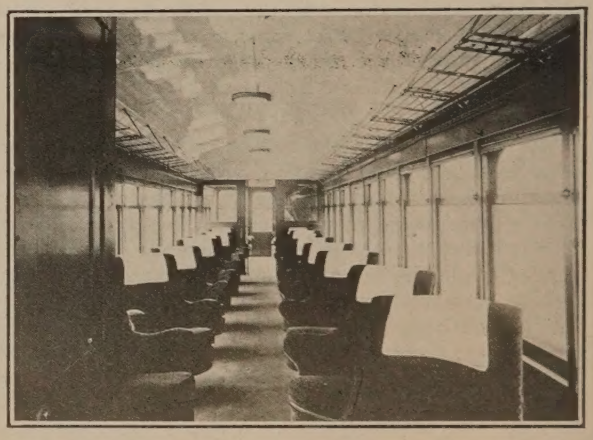
Interior changes of the center-entrance 900 type city car were of a somewhat broader nature. Removal of the rattan seats and the installation of deep-pitched extra comfortable seats, covered with genuine Spanish grain



One of the 900 Type City Cars Has Been Remodeled to Give Greater Comfort

leather, have not only made riding a pleasure but have impressed the riding public. The register rods and pull cords are conspicuous by their absence since their replacement by the electric register system. The dull buff headlining and the five 94-watt compensating dome fixtures give the ceiling a very neat and pleasing appearance. Covering all platform apparatus and piping with metal paneling and camouflaging the bells, buzzers, sign box, reset switch, etc., into the walnut grain finish are other attractive features.

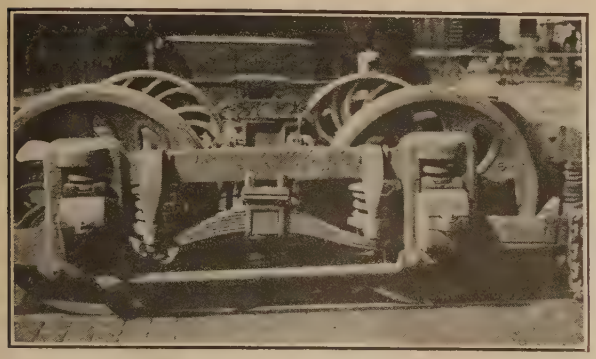
The coal stove has been replaced by electric heaters of the Railway Utility Company's type. Window curtains, which invariably showed signs of rain discoloration, were removed and the top half of the sash glass were



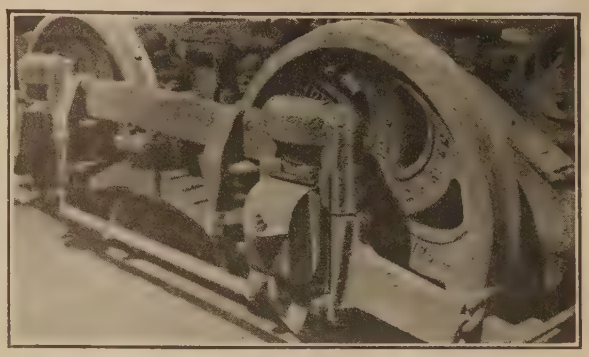
An Appeal to the Car Rider Is Made by the Attractive Appearance of This Remodeled Chair Car of the Lehigh Valley Transit Company

painted brown, giving the external appearance of partially drawn curtains.

The interior of the car, with its walnut grain finish, comfortable seats and the dark tan painted stanchions, metal work and seat ends, presents a very harmonious arrangement and coloring and should act as a stimulant to intensify the riding habit.



Side View of Brill 27-G Truck Purchased in 1900 Before Rebuilding



This Truck Has Side Frame Broken at Pedestal Jib

Excessive Noise Eliminated by Rebuilding Trucks

Worn Frames Were Built Up by Welding—Pedestal Jaws Were Strengthened and New Type Journal Box with Longer Bearing Was Installed

BY REMODELING and rebuilding some Brill 27-G trucks the Grand Rapids Railway, Grand Rapids, Mich., has decreased troubles in service and eliminated excessive noise. The trucks were standard equipment on cars purchased in 1900 and 1906 and had seen severe service.

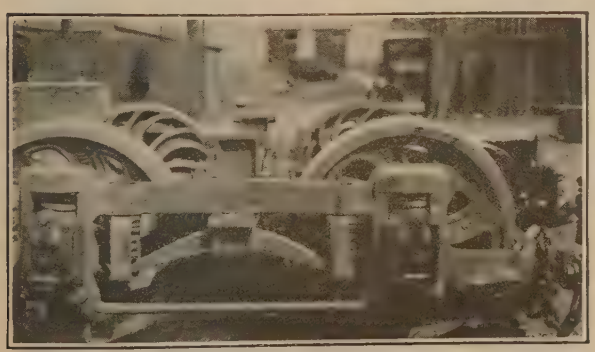
In rejuvenating the trucks they were entirely dismantled and the side frames were carried to the welding department, where all worn or cupped portions were filled in and ground off. Considerable trouble had been experienced with these frames breaking through the pedestal guides at the outside end. The driving motors were outside hung and their weight on the extreme end of the truck end frame undoubtedly contributed to this breakage.

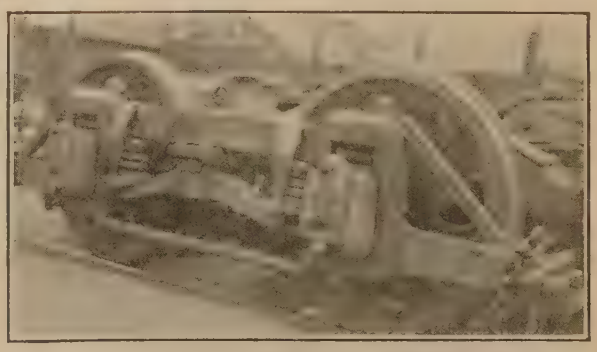
To strengthen the side frames at the outside pedestal jaws a piece of 1½-in. square bar steel was welded to the frame so as to form a diagonal brace. This brace extended along the top of the truck pedestal and then diagonally to the outside edge of the side frame, it being fastened securely by welding. Its installation has eliminated breakage at this point.

The cost of welding braces on the side frames of a two-motor truck was as follows:

Material:	
9-lb. Banox welding steel	$2.25
6 gal. kerosene for preheater	.78
226 cu.ft. oxygen	3.05
237 cu.ft. acetylene	6.16
16 lb. of 1½-in. square steel	.53
Total cost of material	$12.77
Labor:	
Preheating welds, five hours	$3.50
Welding, five hours	4.00
Blacksmith work, one hour	0.65
Total cost of labor	$8.15
Total cost of labor and materials	$20.92

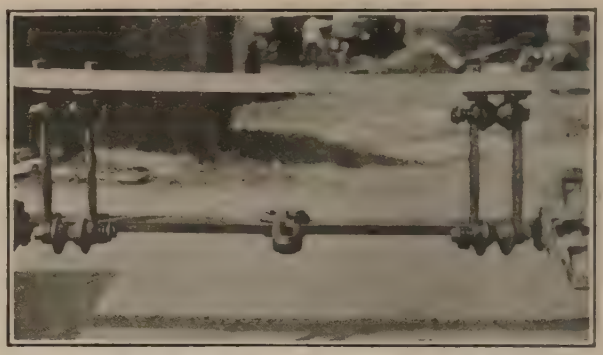
In some cases old type motors were replaced by a more modern type where these were available. One of





At Left—Side View of Brill 27-G Truck After Being Rebuilt. At Right—Truck with Diagonal Brace and New MCB Journal Boxes. The Brace Extends Entirely Across the Top of the Journal Box Pedestal and Along the End of the Truck Frame. Crack in Frame Has Been Welded

Old Type Brake Hanger and Brake Hanger Carrier



New Type Half Ball Brake Hangers as Installed

the illustrations shows a truck strengthened and rebuilt, with GE-203 motors installed in place of GE-57 motors. This change, of course, required some changes in the type of motor suspension. In order to decrease the vibration and do away with excessive noise fiber insulation was inserted wherever steel is laid on steel. Old type brake hangers and brake hanger carriers were also removed and replaced by half-ball brake hangers with 12-in. centers.

New Journal Box Permits Use of a Longer Bearing

At the same time as the other remodeling was done a new type journal box was installed. With the old type box a 2¾-in. length journal brass was as long as could be used. This type required a check plate. The new journal box permitted the use of a journal brass 7½ in. long. Breakage and troubles from hot journals were done away with due to the increased length. The new journal box also made inspection and lubrication easier and cheaper. The new journal box is No. 333-MCB and it fits into the pedestal jaws without change. With the old type of brass wear was excessive at the end next to the check plate and this resulted in a tilting up of the end. With the new brasses a full length bearing is obtained so that there is much less wear and the results obtained indicated an average of 2½ times as much service from the new bearings as from the old. Strengthening of pedestal jaws has eliminated breakage, new journal boxes and brasses have stopped hot bearings and the fiber insulation has reduced noise.

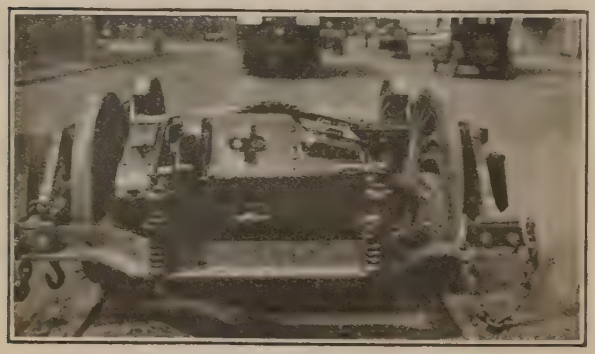
Brill 27 Truck After Being Rebuilt

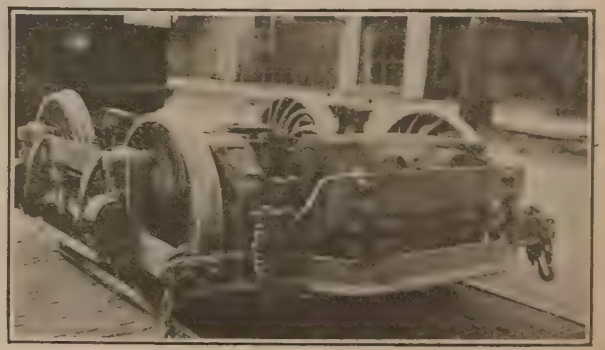
Old Type Journal Box Which Was Discarded

Old Type Journal Brass with Check Plate

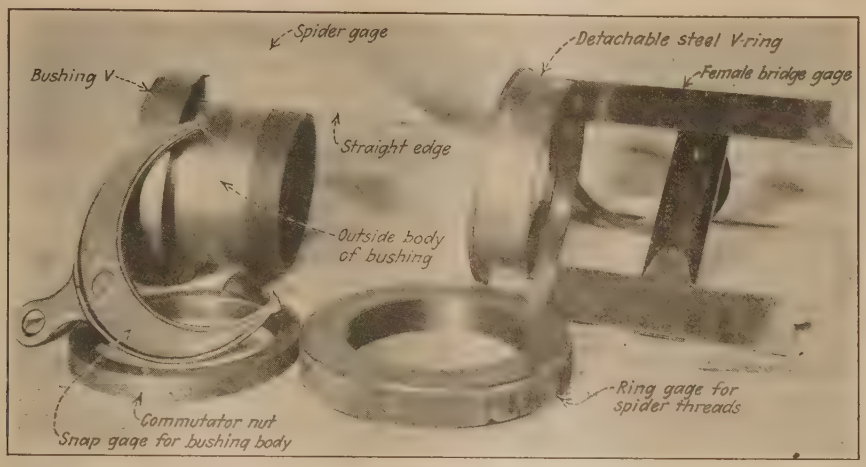
New Type 333 MCB Journal Box

New Journal Brass 3¾ in. x 7 in.





At Left—End View of Overhauled Truck as Equipped with GE-203 Motors. At Right—One of the Rebuilt Trucks Equipped with GE-57 Motors Which Require a Suspension Bar Above the End Frame



Details of the Commutator Spider for a Westinghouse 514-A Commutator with the Necessary Gages for Machining and Measuring the Different Parts

Mica V-Rings and Bushings Have Important Functions in Commutators*

The V-Rings Must Be Made of a Bond Which Will Not Squeeze Out Under Pressure, but Which Will Soften When the Commutator Is Heated so the Ring Will Be Plastic

By Jesse M. Zimmerman
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

THE mica V-rings used in commutators are different from the mica strips in bond characteristics. Mica used for making V-rings must be made with a bond which is not seasoned completely. The ring must remain plastic to a certain extent in order to give yielding effect to the commutator when it passes through the alternate cycles of heating and cooling.

The shape and size of a mica V-ring are very important features in a commutator. The mold upon which it is made must conform accurately in dimensions to the steel V. If the mold is too large the outer surface of the molded V-ring will wrinkle between the bars, leaving an opening. If the mold is too small the V-ring will break when the commutator is assembled.

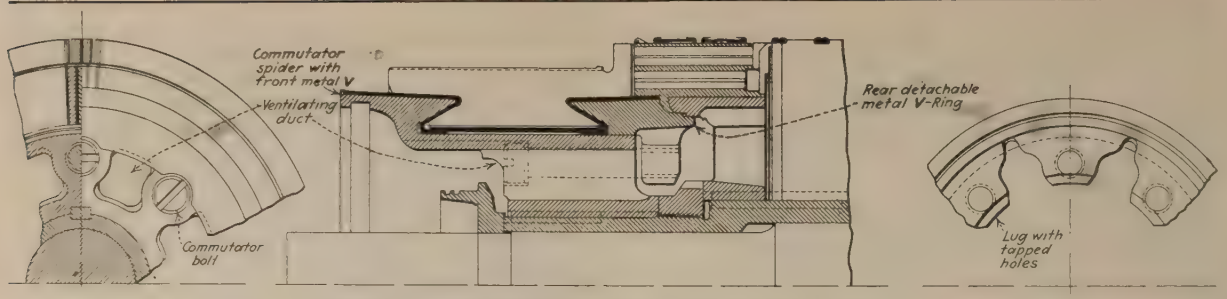
Mica V-rings were originally made in one piece the shape of a V, as illustrated in form I of an accompanying illustration. This shape of V-ring did not give sufficient creepage distance from the commutator to the spider for 600-volt railway motors. By making a flange on the ring the creepage distance was greatly increased. But at this stage of development it was impractical to mold this type of ring at a reasonable cost. This led to the development of the two-piece ring as shown by form II.

The two-piece mica V-ring consists of a 3-deg. tape bushing and a 30-deg. molded V-ring with a bent flange. The longer the flange the greater was the creepage distance. The copper V's are machined with a groove at the bottom of the V to allow an opening for the joints of the two rings when the commutator is being assembled. Theoretically the joint of the two rings makes a perfect seal. On high voltage motors this joint does not permit sufficient creepage distance. Some trouble was experienced with grounds at this point and this led to the development of a one-piece mica V-ring with a flange, which is being used on all modern railway motors. These are shown as forms III-A and III-B. In molding mica V-rings of this type fingers are cut to enable the mica to be molded around the bends of the flange. Several layers of these strips are staggered accurately in order that the openings between the fingers will be covered by the next layer.

The two-piece mica V-ring was easier to make in small sizes as it was molded from a mica plate which was the exact thickness of the finished ring. These rings have a small variation in thickness of ±0.001 in. A one-piece ring may have a maximum variation of ±0.005 in. The reason for this is that the one-piece ring is made of several layers of mica each 0.010 in. thick. Each layer has a variation of ±0.001 in.

Accompanying illustrations show two mica V-rings, which had been in the same commutator, heated to 150 deg. C. and assembled with 25 tons pressure. A 500-watt lamp was placed back of each mica V-ring. The opening around the flange of the rings was sealed with black paper to keep all light of the lamps from the picture except the light which penetrated the mica V-ring. The views were taken looking directly at the 30-deg. face of the rings. The mica V-ring which has a light circle shows clearly where the pressure of the copper and steel V squeezed the bond out of the mica. The light color shows that the thickness of the ring

*This is the fourth article in this series on commutators. Others were: Choosing Materials for Railway Motor Commutators, published Aug. 8; Important Considerations in Replacing Commutator Bars, published Oct. 23, and Accurate Machining of the V's of Assembled Commutators Is Essential, published Nov. 20.



Bolted Type Commutator with Rear Detachable Metal V-Ring

has been reduced by the shifting of bend and mica. At one point the mica in this ring was less than 0.010 in. thick. The other ring shows no signs of light at all. These rings represent what a mica ring should not be and should be respectively.

Important features of mica V-ring construction include: (1) Accurate staggering of the fingers, (2) a bond which will not squeeze out under pressure, (3) a bond which will soften when the commutator is heated so the ring will be plastic, (4) a ring of the same size as the steel V-ring so that the mica will not wrinkle and (5) no slippage of mica in front of the copper or steel V's.

The mica bushing is probably the least thought of in a commutator, yet it has a very important function to fulfill. In order to decrease the diameter of a commutator it is essential that the commutator bars fit close to the spider. By placing an insulating bushing over the spider the distance between the segments and the spider body can be made smaller.

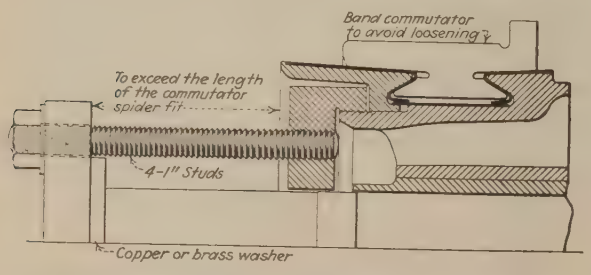
This bushing is sometimes placed inside of the flange of the V-ring, as shown in form III-B, or the flange of the V-ring may fit in the bushing, as shown in form III-A. Either construction will give the same results and is equally accessible in assembling. The bushing is omitted on low-voltage motors where dirt and moisture are not prevalent.

It has been the practice in the past to make these bushings out of mica plate. In later years micarta bushings have been found to be just as serviceable and can be supplied at a lower cost. Therefore, micarta bushings have been replacing to a large extent mica bushings on commutators used on motors up to and including 600 volts.

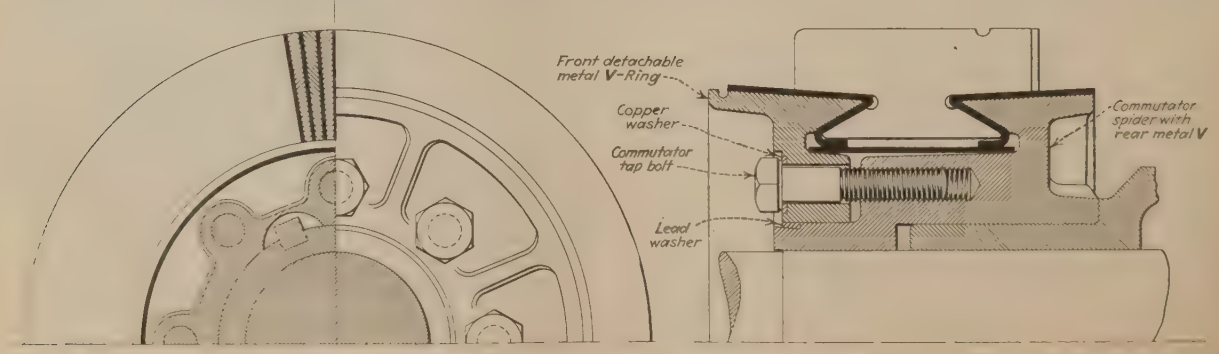
The chief consideration in the design of commutators is to keep the parts together while in service and prevent high bars. This is accomplished by the commutator bushing, which is the foundation. For small commutators the ring-nut type of bushing is used very extensively. However, in larger commutators of this type some difficulty is experienced in railway shops in obtaining a tight commutator, due to the fact that a pressure is not applied to the steel V-ring before the ring nut is drawn tight. Some believe the bolted type of commutator can be tightened without applying a pressure to the steel V-ring. This is not a good policy to follow, as the assembly will not be as tight as it should be unless pressure is applied to the V-ring after the assembly has been heated.

The bushing consists of three parts, the spider, which contains one of the metal V's; the detachable metal V-ring, and the commutator nut or bolts for holding the detachable metal V-ring under pressure. The original commutator spiders were made of cast iron. A great deal of difficulty was experienced with breakage. This difficulty was eliminated by making them of malleable iron or cast steel.

A building without a good foundation is undesirable. A commutator without an accurately machined bushing is just as undesirable. The accuracy of the machining is the most important part of any commutator, as the mechanical stresses can be taken care of by changing to metals which have higher mechanical strength. The first machining operation on the spider is the surfacing of the outside of the body. This surface must be machined to a very accurate dimension, as it is from this surface that the attached metal V's are machined and gaged. The body is measured by a snap gage. The attached metal V is then machined, after which it is



Method Recommended for Pulling Off Commutators with Ring Nut Construction



Bolted Type Commutator with Front Detachable Metal V-Ring

Two Mica V-Rings Which Were Placed in a Commutator Under Identical Conditions, Such as Same Pressure and Temperature
The light section of the ring in the illustration at the left shows squeezing of bond and the slippage of mica due to the pressure of the copper and metal V's. No slippage of mica or squeezing of the bond occurred with the ring shown at the right

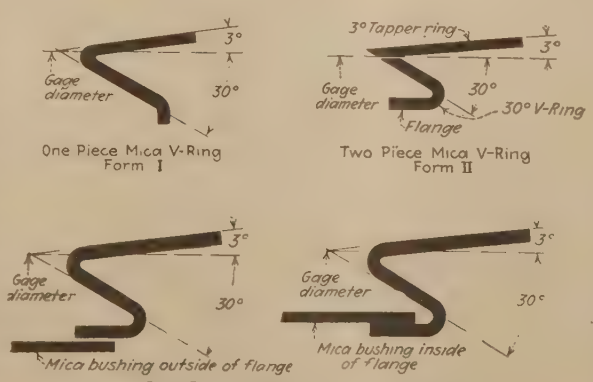
gaged by a spider gage in the following manner: The straight edge of the spider gage is laid upon the body so that the 3-deg. and 30-deg. angles of the V will fit in the V of the spider gage. The depth to which the V is bored is measured from the intersection of the extended side of the 3-deg. and 30-deg. angles of the gage to the rear of the spider by a steel scale. It is very important that the depth of this V be machined accurately, for the rear V must locate the assembled segments accurately.

On most commutators the detachable metal V-ring is the front V-ring. However, some commutators have this detachable ring at the rear. The detachable metal V-ring is gaged by a female bridge gage, which determines the accuracy with which the 3-deg. and 30-deg. faces are machined. The detachable V-ring must fit over the body of the spider with an "iron to iron" fit. It is important that it must not have any more clearance than is necessary for it to slip along the body during the assembling process of the commutator. This will prevent any movement of the detachable V-ring, thus throwing the commutator out of line. The V of the detachable V-ring is measured by a permanent female bridge gage. The ring nut type of commutator has the threads machined on the spider. They are gaged by a ring gage. It is important that the threads be accurately machined so that the ring nut will turn true on the bushing, thus giving equal pressure at all points of contact between the commutator nut and the detachable V-ring when they are assembled.

The bolted type of commutator has been very popular in the railway field, because it is easier to assemble and tighten. However, the use of the bolted construction is confined to the larger types of commutators. This is made in two designs, one with the metal V-ring detachable at the front, the other at the rear. The front ring is more common. It is held to the spider by eight or more tap bolts, equally spaced. A groove is machined in the spider to make the commutator oiltight. After assembling a lead washer is swaged in the groove to close the joint. A copper washer under the tap bolt head keeps out oil at that point.

Where it is necessary to have the large overhanging front metal V, it is a better mechanical design to cast the front metal V as part of the commutator spider. The detachable metal V-ring is at the rear of the commutator; this ring has eight or more tap lugs for the commutator tap bolts, the spider being drilled. This design, in addition to increasing the mechanical strength, lends itself more readily to an increase in the size of the ventilating ducts without increasing the diameter of the commutator.

A method used effectively for pulling the spider of the bolted type commutator from the armature spider is that of placing a steel plate with four equally spaced stud bolts against the end of the shaft, as shown in one of the illustrations on page 1090. By tightening the nuts on these bolts sufficient pressure will be exerted by the bolts to pull the commutator spider off the armature spider. This same method can be applied to the ring nut type of commutator by making a special ring nut as shown in an accompanying line cut. The four equally spaced holes are drilled and tapped in the ring nut for the pulling off bolts to be screwed into. This type of puller is very simple and can be made in any railway shop.

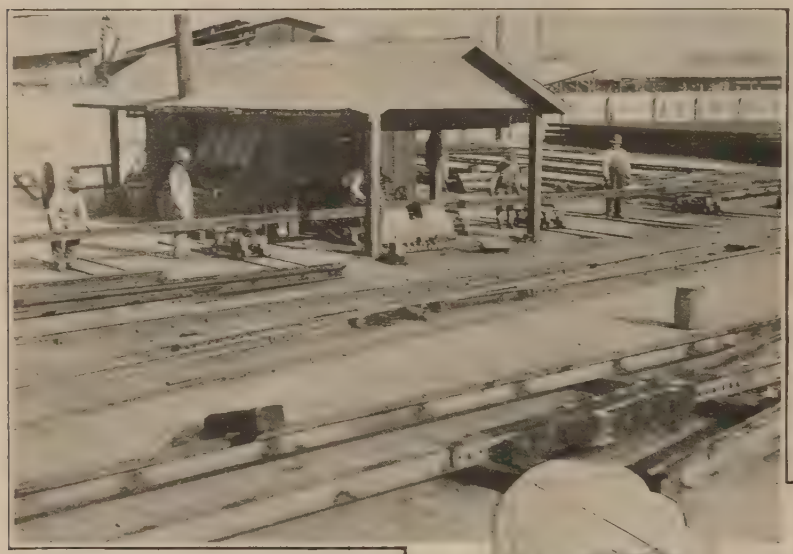


Cross-Section of Different Types of Mica V-Rings

Heavy Track Built in Los Angeles

DURING the past seven years more than one-third of the track mileage of the Los Angeles Railway has been rebuilt according to an extensive program adopted immediately following the period of the war. This work has been carried on since, but not intensified as during the first three years.

Each year finds the company with better track, the new having a life of approximately twenty years built into it. The company's standard construction specification calls for 116-lb. girder rail, with continuous joints, carried on creosoted pine ties. As this property is 3-ft. 6-in. gage, 6-ft. ties are used. The track is laid on a 6-in. concrete base supported by a 6-in. sub-base of tamped and rolled crushed stone, with a 2-in. asphalt wearing surface on top. This latter construction is standard for all streets in the city.



Laying Out Rail Construction

The material yard of the way and structures department of the Los Angeles Railway is used for the laying out of special work and the stocking of materials. The 350-ton hydraulic rail bender forms all curves used. A set of 100 radius boards furnish patterns for every curve used on the system.

The practice of placing rows of brick on both sides of the rail was discontinued after comparative tests were made between track so constructed and track without such protection. The need for the bricks having gone with the disappearance of steel-tired vehicles, the former construction has been adopted at a saving of approximately 5 cents per square foot.

Trackwork is carried on each year in an intensive way between April and October. Although climatic conditions in Los Angeles permit outside work during the winter months, the rainy weather which prevails during November, December, January and February hampers the outdoor gangs. In any other city this rainy weather would not be considered an obstacle to outside work. However, between April and October it seldom rains in Los Angeles and it is therefore possible for the outdoor track gangs to work every day. During this season the department places about 700 men on the work and in that way clears it all up in a very short time.

Two types of trackwork are done. One is the rebuilding of old track which has been in service for such a period as to require new rail and new roadbed. The other is reconstruction work necessary because of the change of street grades by the city. Much of this is now being done by the city in providing storm sewers. In some places a change of grade of 12 ft. has been necessary. As such work cannot be anticipated in advance, it is not included in the budget prepared by the department. However, all reconstruction of old track is prepared for in advance and carried in the budget.

Reconstruction work must be done under traffic. A short period in the early morning hours can be utilized for cutting out of certain portions of the track. However, it is impossible, due to the automobile congestion, to keep a track or portion of the street out of service during the day. In some locations, work can be done on one side while a single track movement can be maintained on the other. For this purpose portable crossovers are used. These are not only valuable for this purpose but also for the single-tracking or rerouting of cars during the rainy season when the streets become flooded.

Flat Car Provided with Cross-overs

A set of portable cross-overs are kept on a flat car ready for an emergency call because of the heavy floods encountered in the rainy season.

A large yard is maintained by the way and structures department where special trackwork is laid out and rails are bent to curvatures. The company purchases its special work from trackwork manufacturers, the type used having hard centers. Curves are formed out of the 62-ft. lengths of rail with a 350-ton hydraulic rail bender. Of the 700 or 800 tons of rail stocked at the yards, approximately 250 tons is of the guard rail type to go with the 116-lb. grooved girder rail. In the construction of track no special problems are encountered because of the narrow gage.

Electric welded, continuous joints are standard. An accompanying illustration shows a typical joint with the plate welded at the head and base of the rail. One bolt in each rail is spot welded to the plate at the head-end, the nut is welded to the plate on the other side and the bolt welded to the nut. This precaution tends

to eliminate loose bolts. In lining up track preparatory to welding, advantage is taken of the difference in temperature between day and night to secure a tight joint. The open end of the rail length is blocked each night when the temperature is low. The heat of the day then expands the rail, causing the joint to close up.

Type of electrically welded continuous rail joint used in Los Angeles with the 116-lb. grooved girder rail. The plate is electrically welded at the head and base of the rail while the bolt and nut are spot welded.

This is done for several days and then the plates are welded in position.

All sub-base work is tamped with air tampers and then rolled with a 5-ton steam roller. The concreting and surface paving are let out on contract. With an asphalt surface as specified, it requires an extensive asphalt plant and all of the equipment which goes with it to do this work. The railway, not having enough of it to warrant such an investment in plant and equipment, has the work done by an outside contractor.

The Readers' Forum

More Data on Paris Type L Car

THE J. G. BRILL COMPANY

PHILADELPHIA, PA., Dec. 8, 1926.

To the Editor:

I was very much interested in reading in your issue of Oct. 23 the editorial on "Changes from Conventional Truck Design Are Attracting Increased Attention," particularly with reference to reduction of unsprung weight. You are, of course, familiar with the fact that when electricity was first used as motive power for street railway transportation the motors were mounted on the car body and much difficulty was encountered. When John A. Brill, formerly vice-president of this company, developed the first system of electric car trucks in 1887 his mounting the motors on independent trucks, instead of the body as had been attempted, was considered a very progressive step, which fact is attested to by the general adoption of this practice.

Your reference to activities in Europe interests me very much, and I have made a very careful study of the articles published in the JOURNAL on the European cars where some experimentation has been made with the shaft type of transmission. I have not only read the article in your issue of Sept. 11 on the Paris cars, but also have read the article in the May (not May 26), 1926, issue of *L'Industrie des Voies Ferrées et des Transports Automobiles* referred to in the JOURNAL article, and also the Proceedings of the Nineteenth International Congress, held in Paris June 16 to 22, 1924, which contains the details of the Paris tramways type "L" car referred to, in a report by H. Dubath, ingenieur de la Société Industrielle Suisse, Neuhausen.

In your Sept. 11 article you give the seating capacity of the Paris type "L" car as 49 passengers and the complete weight empty as 28,380 lb., while the weight per seated passenger is given as 580 lb. Reference to the above-mentioned proceedings, page 579, reveals:

"Les nouvelles motrices légères, type 'L,' de la S.T.C.R.P., tare 12.5 t., places assises 30, total des places 49, transportent elles, un poids mort de 415 kg. par place assise et 255 kg., par rapport au nombre total des places offertes."

According to our interpretation this reads that "the new light-weight motor cars for the Paris tramways, type "L," tare weight 12.5 metric tons (27,500 lb. and not 28,380 as given in your article); seating capacity 30 (instead of 49); total capacity 49; carry a dead weight of 415 kg. (913 lb.) per seated passenger and 561 lb. in relation to the total capacity."

There have been built in this country many four-wheel cars that seat more than 30 passengers and have a total carrying capacity greater than 49, the unsprung weight of which has often been several hundred pounds lighter than the 4,100 lb. given for these Paris cars, which are only light in respect to the former cars which the railway system operated. As your editorial apparently features the matter of unsprung weight I do not feel that these cars bear out your contentions and both the article and editorial lose much of their significance.

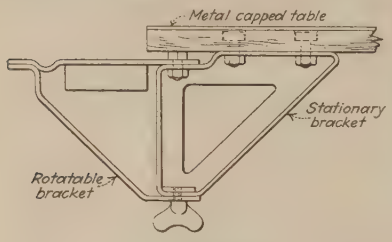
WALTER S. ADAMS,
Designing Engineer.

EDITOR'S NOTE: Mr. Adams is correct in regard to the passenger carrying capacity of the type L car of the Paris system. In the magazine article abstracted, no division was given as to seated and standing passengers. The latest information on this car is given in a paper presented at the international convention at Barcelona, Oct. 10-16, 1926, by Paul Mariage, commercial manager of the Paris system. He gives the capacity of the car, when used as the head car in a train, as 30 seated and 19 standing. When used as the second car there is room for four more standing passengers. As to total weight empty, different figures have been published from time to time, due possibly to slight changes in the methods of construction or more probably to the equipment included. The paper by Mr. Dubath at the 1924 Paris convention, quoted by Mr. Adams, gives "tare" weight 12.5 metric tons, or practically 27,500 lb. The magazine article abstracted in the JOURNAL gives for the latest type at that time 12,900 kg. or 28,380 lb. This was the figure published. Mr. Mariage's 1926 report, mentioned above and just received, gives 12,800 kg., or approximately 28,160 lb., as the total weight, empty, with complete tool equipment, full sand boxes and windows in place. According to American standards most continental European cars are not particularly light per seat or per passenger carried, due to two causes. One is that many cars are narrow so that only three instead of four passengers can be seated across the car on cross seats. This is true in all Paris surface cars. The other is that the number of standing passengers is limited. Thus, in the car in question, no passengers are allowed to stand in the aisles, but only on the end platforms and in the center well. The point made in the editorial was that changes from conventional practice in the direction of the European experiments mentioned may offer the opportunity of reducing upsprung weight. The editorial also commended the value of this research work being carried on in Europe. The entire art of gear and transmission design and manufacture has made long strides since the early days of body mounted motors mentioned by Mr. Adams.

Maintenance Notes

Disappearing Armature Winding Stand

THE accompanying illustrations show a disappearing type of armature winding stand used while rewinding the smaller sizes of armatures such as are used in compressor motors in the department of electrical repairs of the Brooklyn-Manhattan Transit Corporation. The support consists of two hinged

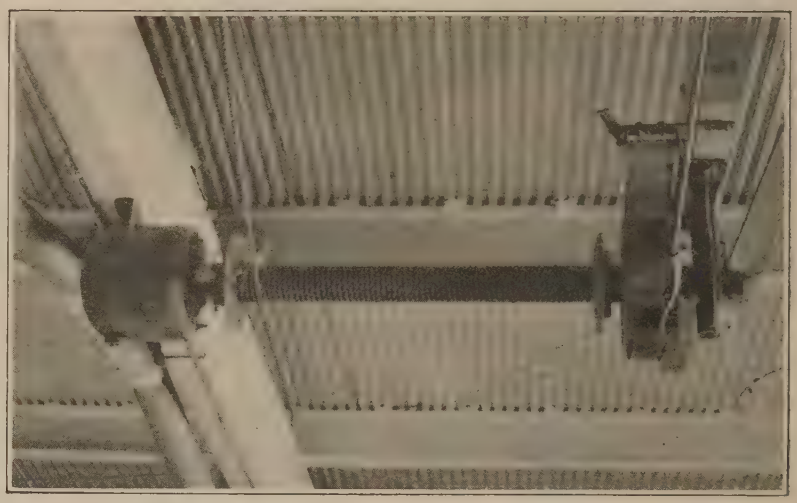


Construction of Disappearing Armature Winding Brackets

brackets which can be swung under the bench when not in use. In the illustration showing the construction only one bracket is shown. In case the armature shaft should be too short to span the distance between the supports small lengths of pipe are used to increase the effective length of the shaft. These are slipped over the ends of the original armature shaft.

In the construction used a stationary bracket is bolted to the underside of the winding bench. The bracket which supports the armature is hinged at the top and bottom of the stationary support so that it rotates readily and can be swung out of way or adjusted to convenient positions.

Armature in Position for Rewinding Supported by Two Disappearing Brackets at the Winding Bench



Motor-Operated Hoist Ready for Service

Air Compressor Motor Used for Lumber Hoist

HANDLING of light incoming lumber from the ground floor of the shop to the storage space located in the balcony of the Jamestown Street Railway shop in Jamestown, N. Y., is done by a motor-operated hoist installed in the balcony. Certain parts needed for the hoist construction were on hand, and as the cost of assembling these parts was much less than a manufactured product, K. L. Connor, master mechanic, decided to build the hoist in the shop. Material used included an Allis-Chalmers air compressor motor, a 5-ft. x 1½-in. shaft, a 12-in. pulley with a 6-in. base, a standard line shaft bearing and a 6-in. leather brake.

The armature of the Allis-Chalmers air compressor motor was pressed onto the end of a 1½-in. round shaft about 5 ft. long. A 12-in. pulley with a 6-in. face was keyed securely to the shaft 1 ft. from the other end. The assembled unit was installed and lined up on the ceiling of the gallery. The extended armature shaft with auxiliary parts is supported at one end by the

"Rattles and bumps" will accelerate your cars over the dumps.

motor end bell bearing and at the other by the line shaft bearing.

One end of the 6-in. x ½-in. leather belt is wrapped around the pulley and the other end is connected to a ⅝-in. iron rod which is fastened to one end of a fulcrum casting about 6 ft. away. The fulcrum casting is connected to an adjustable hand rod which permits most any desired leverage with corresponding friction upon the pulley to be obtained. With this arrangement the load can be held or dropped as desired.

The speed of the motor is controlled by varying the resistance in the armature circuit. Direction of rotation is regulated by field reversing switches conveniently located. This hoist is doing most satisfactorily the work for which it was designed and its use has resulted in speeding up the lumber handling.

Systematic Oiling "Safetyfies"
Thus reduce your "S.O.S." cries.

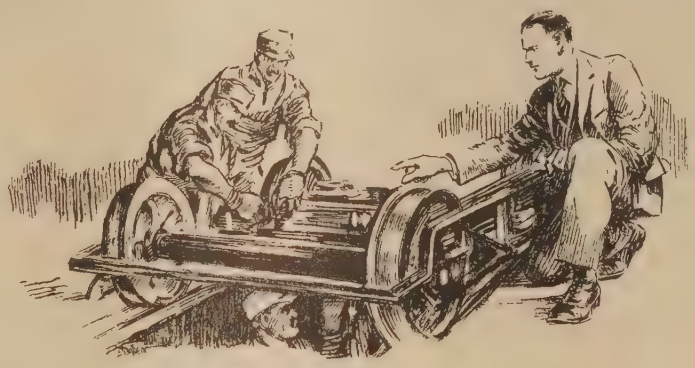
Sand Car with Six Hopper Outlets

SIMPLIFICATION of rail sanding methods and continuity of sand flow have been considered of such great importance by the York Railways, York, Pa., that a special sanding equipment was designed and constructed. A single-truck passenger car, having served its usefulness, was stripped of all internal fittings. Two large sand bins were constructed along either side throughout the entire length. Each bin can accommodate 5 cu.yd. of sand when filled to capacity and is made of

Sand Bin and Hopper Operating Levers

Dick Prescott Inspects an Overhaul

and Sees a Wood Block



STEVE WHITE, carpenter shop foreman, was worried about the mutterings that he had heard among the men in the Consolidated Railway & Light Company's shop. He lost no time in voicing his uneasiness to Dick Prescott, young assistant superintendent, for whom he had developed a deep regard and friendship.

But Dick was not disposed to take the subject seriously. He felt that it was entirely natural for some of the men to question the wisdom of his appointment, after so brief an experience, and almost dismissed the subject from his mind on leaving the little carpenter shop office. Steve, however, continued to feel grave concern for his friend Dick.

Absorbed in the job of improving maintenance practice, Dick went on out to the overhaul shop, where one of the largest group of cars on the property was being put through as rapidly as the cars could be taken out of service. Several gangs of men were at work on this job and Dick stopped near one of the trucks to look over the work.

"How do you find them, Joe, in pretty bad shape?" queried Dick, addressing the workman in charge of the gang.

"You bet, bad," grunted Joe. "Big job to fix 'em."

"Guess you're right, Joe. They went too long without any real attention and now they're pretty well shot, eh?"

"Yeh," again grunted Joe in assent.

"How fast are you fellows going to get them through the shop?"

"Slow work," said Joe. "Too unhandy here to get much done. Have to fool around lot. Only two tracks here. Cars in way. Too much time jacking up and down. Lose lot's time. Cost lot's money."

"Yes," agreed Dick, "I can see that, all right. You have to get the cars on this track all up on horses to get the trucks out. Then the men on body work back there have to do a lot of climbing up and down to get in the cars. We need a car hoist or crane here pretty bad."

"Need it bad," repeated Joe.

Dick continued to watch Joe and his men as they proceeded systematically with their work of dismantling the truck. He noted that the gears were badly worn and that they showed evidence of lack of proper lubrication.

"Do you find many of the gears in bad shape like that?" he asked.

"Yeh, lot's of 'em. Gear cases all shot and some trucks no cases at all."

"That's a nice mess," said Dick. "What's the matter with them? Don't we have enough gear cases to go around?"

"Knock 'em all off," was Joe's comment. "Track on Main Street in hell of a shape. Paving all shot and busts gear cases every day."

"Well, that's going to be different soon, Joe. They're working on the Main Street track now and it will be in first-class shape in a few weeks. That means we've got to go after these trucks right now that we've got a chance to do so. Are there plenty of gear cases in stock?"

"Yep," replied Joe.

"All right. Make sure every truck is fully equipped when it leaves here, with plenty of grease on the gears. Then I'm going to get after the carhouses to make sure they keep them that way."

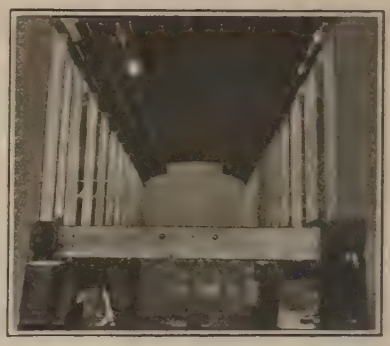
At this point one of the men unbolted the center bearing and removed it from the bolster.

"What do they have that wood block under the bearing for?" asked Dick, suddenly interested.

heavy yellow pine planking reinforced by substantial oak timbers.

Three Brill sand hoppers are a part of each bin, having exits in front of and between the wheels directly over each rail. Operation is by individual hand levers installed on the front of the bin and held in a latched position by a notched circle plate. This is mounted directly in front, thus permitting any desired degree of sand flow. The operating handle normally is held in the off position by a heavy coil spring attached to the lower extremity of the lever. This multiplicity of sanding outlets has eliminated the constant shoveling of sand into the hoppers, decreased the possibility of failure and has permitted the operator carefully to observe the results obtained by the sanding equipment.

You may forget your dignity, but don't lose your "bearings." Watch your babbitting.



Underframing of One-Man Cars Being Converted in Shop at Scranton

84½ Per Cent One-Man Operation Reached in Scranton

ONE hundred per cent one-man operation is the aim of the Scranton Railway, Scranton, Pa. When the ten two-man cars now being rebuilt in this company's shop are completed for one-man operation 84½ per cent one-man operation will have been attained. Two of these have been completed and the remaining eight are well under way. Such parts of the old body and equipment have been used as were found suitable for further service and which would conform to the design adopted.

Interior View of One-Man Car Showing Motorman's Unobstructed View

For economical reasons new framing was constructed with side and end sills of long-leaf yellow pine reinforced by well-seasoned oak cross framing. The sills employed are somewhat heavier than are ordinarily used on cars of this type and weight, being of 7⅜-in. x 9-in. and 5½-in. x 10-in. material respectively. Siding consists of ⅛-in. steel plates securely screwed to the posts. Rattan seats removed from the old cars were utilized. They consist of twelve cross and four longitudinal seats to provide for 45 passengers.

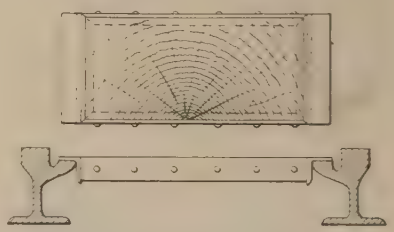
Old equipment of GE-80 motors with K-28 control and straight air brakes was completely overhauled and reinstalled. New safety devices of the National Pneumatic Company were adopted. An added safety feature is that of an adjustable observation mirror installed on the vestibule post which permits the motorman to obtain a clear view of the rear step of the car under all conditions.

The coloring of the outside of the car is orange with cream trimming and the inside is white veneer with cherry trimming. These color combinations give a very pleasing effect.

Completed One-Man Car with Motorman's Observation Mirror

Carhouse Pit Planks Reduce Accidents

OPEN car pits or insecure pit planks are always a source of serious danger to the men working in and about a shop. This has been eliminated to a great extent in the shop of the Harrisburg Railways, Harrisburg, Pa., by the adoption of a rigid non-shifting pit plank, designed by the company.



Protected by a Frame of Angles the Pit Plank Fits Accurately Between Rails

This plank consists of a piece of 1-in. x 14-in. oak securely incased in a frame of 1-in. angles. Pieces of 1¼-in. angle are welded to the backs of the angles at the ends, with the top flush with the top surface of the plank. The over-all dimensions of the plank with its framing are just sufficient to permit it to drop between the rails without any lateral motion and the length over the supporting angles allows for wheel flange clearance. This plank affords a ready means for the men to pass across a pit. There is no necessity to raise it to permit of truck passage as is the case when planks are laid

on top of the rail. Again, danger of breakage and slippage is minimized, as no lateral motion is possible and flange clearance is provided. Since these planks have been in service pit accidents have been reduced greatly.

Refuse Receptacle for Car Floor Sweepings

MAINTAINING a clean appearance of the shop floor of the Valley Railways, Lemoyne, Pa., is given constant attention by the organization. Suitable containers placed in convenient locations throughout the shop for the reception of refuse material, together with a receptacle to receive car floor sweepings, assist greatly in this.

Receptacle in Position to Receive Car Floor Sweepings

This receptacle is made of No. 16 gage galvanized iron having a base dimension of 8 in. x 15 in. and a sloping top. The maximum height is about 18 in. and the minimum such as to permit of sliding under the platform flooring, while the container rests on the car step. Suitable handles are provided for carrying.

Placing the receptacle on the car step for the reception of the floor sweepings not only eliminates double handling of the refuse but keeps it from being scattered over the shop floor, from where it would be tracked still further by the workmen.

The electric railway and your car journals
Both deserve careful thought as to their internals.

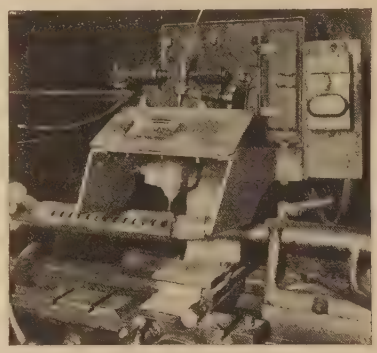
New Equipment Available

Automatic Welding Insures Better Workmanship

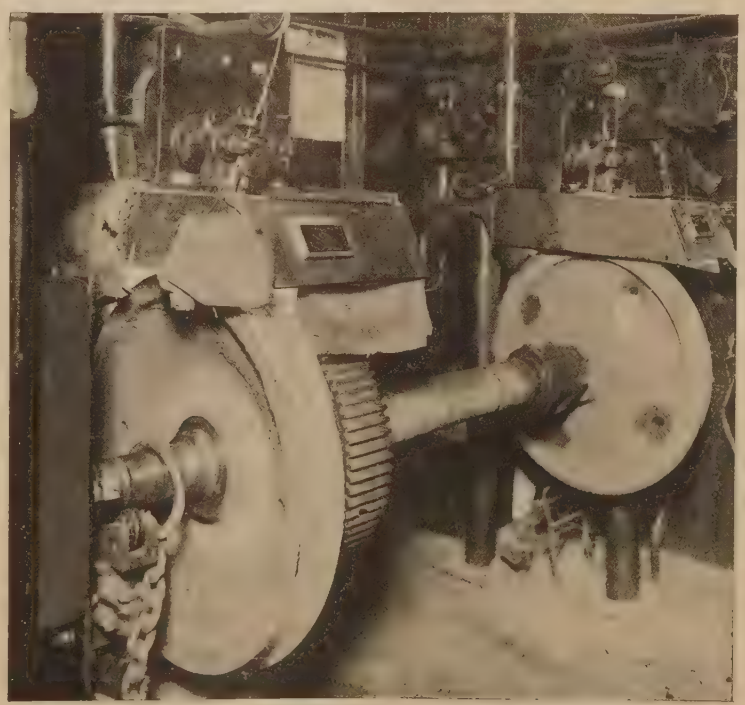
INCREASED use of automatic arc welding is being made in electric railway repair shops because the welds produced are reliable and the human element in welding is decreased. To meet the needs for an automatic welding machine, the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has brought out the Auto-Arc.

A large field of usefulness for the new automatic machine, it is stated, is for welding and building up of worn surfaces, such as those on brake equalizers, and other brake rigging parts. For this purpose the Auto-Arc is mounted on the carriage of a lathe so that it can be moved along the work either by hand or by the lead screw, with an adjustable driving speed. The brake equalizer or other part is placed on the lathe and the sides are held in position temporarily by a clamping device. The operator starts the machine, and with the work remaining stationary the welding is performed as the Auto-Arc moves along and deposits a seam of metal.

Another use for which the new welding machine is adapted is that of building up worn flanges of steel wheels used in city service. The worn wheel is placed in a device that consists of two stationary pedestals on which the car wheels are free to rotate. The wheels are driven by an attachment to the axle through a reduction gear, which in turn is driven by a small motor. The Auto-Arcs are mounted on a stationary pedestal and are free to swing as desired by the operator. As the wheels revolve



Equalizer Bar in Place on Lathe with Auto-Arc Ready to Start Welding Operation



Worn Car Wheels in Position for Welding Automatically

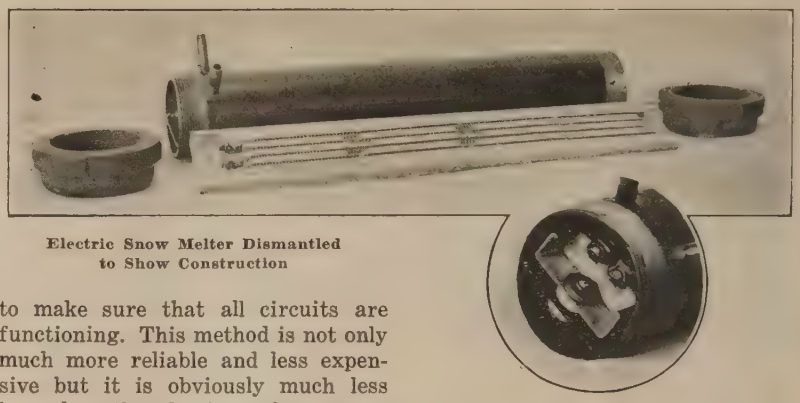
the Auto-Arcs deposit the metal at a peripheral speed of about 10 to 12 in. per minute. A set of car wheel flanges can thus be built up in approximately 2½ hours.

Electric Snow Melter for Track Switches

BY JOHN M. BOND
Transportation Division, Westinghouse Electric & Manufacturing Company, New York, N. Y.

KEEPING track switches open and operative during snowstorms can be accomplished best by keeping the points and mechanism above a freezing temperature. For this purpose the Westinghouse Electric & Manufacturing Company has brought out an electric snow melter. This was developed for and is now used extensively by the Interborough Rapid Transit Company, New York. The switches on the Interborough are of the automatic type, controlled from towers. During severe snowstorms they are liable to give trouble due to freezing or clogging with snow unless they are kept clear. The method used in the past was by shoveling and sweeping, but this requires a large force of men and equipment which must be held available for such emergencies during the winter months, and consequently is very costly and none too satisfactory.

The snow melters eliminate this manual work by giving off sufficient heat to melt the snow as soon as it reaches the ground and also to keep the switch movement from freezing. The number of men needed is reduced to a minimum of perhaps one or two, their only duty being to see that the current is properly turned on when the snowstorm begins and to inspect the switches occasionally to make sure that all circuits are functioning. This method is not only much more reliable and less expensive but it is obviously much less hazardous than having a large number of men shoveling and sweeping out switches during a blinding snowstorm within a foot or two of a live 600-volt contact rail.



Electric Snow Melter Dismantled to Show Construction

The snow melters are designed to withstand extremely rough handling, such as being struck with picks and shovels. The heater element is made up of two coils, about ¼ in. in diameter, of nickel-chromium wire connected in parallel and supported in four grooved porcelain blocks which are held firmly in a sheet steel trough running lengthwise through a standard 3½-in. black steel pipe, 2 ft. long. The trough is sherardized to prevent rusting and is attached by insulated bolts to cross bars which are welded inside the pipe at each end.

Both terminals are at the same end of the pipe. Two standard pipe nipples located just above the terminals provide entrances for the connecting wires, which are sealed with tape and compound into the nipples, both outer and inner edges of which are beveled to prevent damage to the insulation of the wires. The ends of the pipe are equipped with standard light-weight pipe caps, red leaded to make the units watertight. By removing the end cap nearest the nipples the two terminals are exposed and are easily accessible for the purpose of connecting the units during installation. A steel terminal clip welded to the outside of the pipe provides a means for grounding the case of the unit.

The units supplied to the Interborough Rapid Transit Company were designed to operate twelve in series on a 650-volt, d.c. circuit, this being the number of units used at a switch. Connected in this manner each unit consumes 1,200 watts or a total of 14,400 watts per switch. Since the power used by the snow melters is proportional to the square of the applied voltage, the heat given off will, of course, vary accordingly. The current is taken from the contact rail through a fuse and a single-pole, single-throw knife switch directly to the units, each track switch equipment being supplied with its own knife switch and fuse so that it can be controlled independently of the others. Six units are placed under each switch point, the switches on this property being of the double blade type. In certain cases, however, depending on the curvature of the switch, the number of heaters used may vary from twelve to twenty. Also one heater is placed under the switch movement.

The heaters are laid horizontally on the roadbed between approximately alternate pairs of ties and parallel with them, beginning at a point just ahead of the switch blade and proceeding back toward the heel of the switch. All cases are grounded to a common wire. They are located not less than 1 to 2 in. below the bottom surface of the track as a precaution against interference with the automatic signal circuits if the casings of the units should come in contact with the rails.

The Switch in the Foreground Is Equipped with Snow Melters in 148th Street Yard of Interborough Rapid Transit Company, New York City, During Severere Snowstorm. The Rear Switch Being Swept Out by Workmen Has No Snow Melters

Association News & Discussions

Snow Fighting in New England

Symposium Presented at Recent Meeting of the New England Street Railway Club Considers Methods of Keeping the Lines Open in Bad Weather so as to Increase Passenger Riding

DISCUSSION at the last meeting of the New England Street Railway Club, held in Boston on Dec. 2, was devoted largely to the subject of snow fighting. This was mentioned only briefly in last week's issue. In introducing the subject President F. D. Gordon emphasized the change in attitude of street railway men. Formerly they were satisfied to obtain sufficient revenue in the summer months to carry the road through the year. Nowadays, when rail transportation furnishes greater convenience than automobile transportation in the winter, January, February and March are the best revenue producers, and attention must be given to keeping the tracks open and the cars as nearly on schedule as possible. Four papers on this subject, by Messrs. Scott, Flanders, Bolt and Lockman, are abstracted elsewhere in this issue.

In the discussion Mr. Scott stated that crews make particular note of any excavations or unfinished street work prior to snow storms. Any obstructions that might interfere with the snow plows or wings are given particular attention. He also believes that an ordinance should be passed prohibiting automobile parking along the curb for 24 hours succeeding a snow storm. This would permit the city and company to clean up the streets quickly and would not only help the schedules but would help the public.

Both sweepers and plows are used by the Connecticut Company, according to Mr. Scott. Sweepers are not as satisfactory now as before the automobiles were on the streets. With the temperature low and starting with the beginning of a storm the sweepers will do good work. They are also used in the heat of the day after the snow is loosened up.

Low spots and grooved rails are salted, depending on storm conditions, while the track is salted right along. In a heavy storm with the temperature dropping the amount of salt used is greatest. The coarse grade of salt is used. Salt is distributed in 100-lb. bags in Providence and in 56-lb. bags in Connecticut. In 56-lb. bags it costs $15.71 a ton, in 100-lb. bags $13.80 a ton and in bulk some $5 or $6 a ton cheaper. The reason given for favoring the use of smaller bags than 200 lb. is the greater ease of handling.

In the absence of Mr. Flanders, his paper was read by H. J. Sullivan, superintendent of line and track Springfield Street Railway. Mr. Sullivan stated that better results are obtained in Springfield with sweepers than with plows. Rattan and steel mixed are used in the brooms. Canvas guards are used with the sweepers, to prevent breakage of windows or injury to pedestrians. Ice cutters with teeth are used to advantage. In Springfield the city assists with traction snow plows by pushing the snow directly over to the gutters, thus keeping the street clean. This year the city will have 38 trucks and seven tractors for the work. On some streets the city does all the cleaning while on others the railway handles it. The snow is dumped into the Connecticut River.

In Springfield several drivers of coal trucks have been arrested for stopping their vehicles on the car tracks and obstructing the street. When the snow loaders are started out they are accompanied by police officers, who move all automobiles out of the way so that the snow can be loaded.

On the Eastern Massachusetts Street Railway, according to Mr. Bolt, the single-truck snow plows are not a very important factor. During wet snow storms the service should alternate with a plow trip following two or three round trips of sweepers.

Buses that are equipped with scrapers can be operated in 3 to 4 in. of snow. After it gets deeper than that the scrapers are lifted and the roadway must be plowed with caterpillars or trucks.

The levelers of this company weigh about 1½ or 2 tons each, and are put on or taken off with the aid of crane cars. They are adjusted to the angle desired and then held in place by means of chains.

The Cumberland County Light & Power Company has also used levelers or wings on its plows. These are about 18 ft. long, according to G. C. Haggas, chief engineer. The use of the levelers has provided a place for automobiles away from the car track.

A rotary ice cutter developed by the Eastern Massachusetts several years ago was described by Mr. Glynn of that company. This machine cut so much ice that a platform was built out in front. After that an equipment was designed having a conveyor with 5-ft. blades. Not enough men could be put in the small space to shovel the snow off. Then a snow plow was designed built of steel and having solid steel blades raised or lowered by hydraulic jacks. A cross conveyor was put on. The plow was able to take off 1 in. of solid ice with a layer of 3½ ft. of snow for a distance of ½ mile in an hour and a half. The machine does not compress the snow, but lifts it.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Jan. 6-7—Midwest Electric Railway Association, midwinter meeting, Mayo Hotel, Tulsa, Okla.

Jan. 7—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

Jan. 10-14—American Road Builders' Association, convention and road show, Coliseum, Chicago, Ill.

Jan. 18-19—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.

Jan. 19-20—Central Electric Traffic Association, Fort Wayne, Ind.

Jan. 21-22—Central Electric Railway Accountants' Association, Fort Wayne, Ind.

Jan. 25—New York Electric Railway Association, winter meeting. Hotel Commodore, New York City.

Jan. 26-28—Association of Equipment Men—Southern Properties—Memphis, Tenn.

Feb. 3-4—Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.

Feb. 7-10—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.

Feb. 10—Central Electric Railway Master Mechanics' Association, Toledo, Ohio.

Oct. 3-7, 1927—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.

Fighting Snow in Springfield and Worcester

BY H. M. FLANDERS
General Manager Springfield Street Railway, Springfield, Mass.

SPRINGFIELD and Worcester have street railway properties with similar physical characteristics. The total track mileage of the Springfield company is 203 and of the Worcester company 292. About half the mileage of each company is in center location in city streets, the other half being suburban lines, mostly of side location. Each company operates about 7,000,000 car-miles per year.

Snow-fighting organization and methods are practically identical on each property and are in charge of division superintendents. The transportation department is responsible for manning plows and sweepers, assigning

them to the lines and for keeping the lines open. The track department is responsible for the removal of all snow from streets where necessary and for keeping switches, yards, ditches and drains clear.

Each fall the division superintendents assign crews to certain lines. Each of the plows and sweepers sent out is manned by two or three uniform men, the third being a uniform man taken from the spare list.

The plows and sweepers so manned are sent out to the assigned lines as soon as the superintendents deem it to be necessary, a record being made on a sheet similar to a train dispatcher's sheet. Each crew has instructions to telephone the superintendent as often as practicable, posting him on conditions, and this information, with any special orders, is all recorded on the snow-dispatching sheet. All street inspectors report to the superintendent. Certain men are assigned to fixed strategic points, the remainder going to various points as required to act as the superintendent's representative on the job. The superintendent of tracks has authority to employ as many extra men and trucks as are necessary for his snow removal work.

As soon as the storm starts, the mechanical department assigns men to care for snow-fighting equipment. These men are on duty until the storm ends and attend to oiling, greasing and repairing as needed.

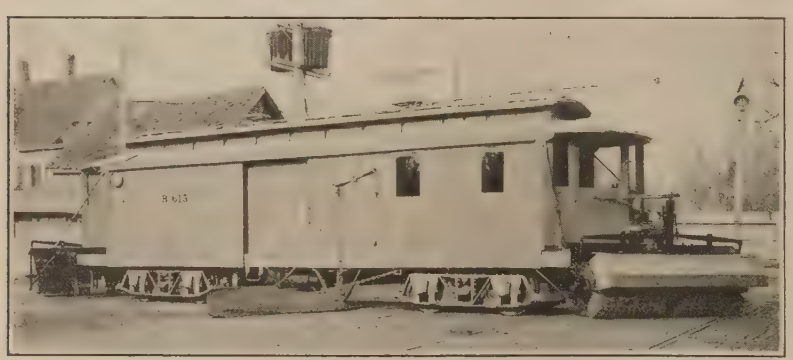
Springfield and Worcester each has one double truck rotary plow. These are rarely used; in fact, only in cases of extreme drifts. Springfield has four double-truck nose plows and five double-truck shear plows; Worcester ten double-truck nose plows and seven double-truck shear. Springfield also has nine single-truck shears and three single-truck nose plows, while Worcester has three single-truck shears and two single-truck nose plows. Except in light snows, the single-truck plows are practically worthless unless operated with a pusher.

Springfield has two single-truck sweepers and nine double-truck sweepers. The former are used principally to keep our open air storage yard clear. Double-truck sweepers are used on the line. Worcester has thirteen double-truck sweepers. In both cities the double-truck sweepers are more efficient in practically any kind of a storm than are the double-truck plows. We have no figures of value as to comparative operating of maintenance cost of plows and sweepers. We believe that the sweepers can be operated and maintained at a much lower cost than the plows. Practically no cars in Springfield or Worcester are equipped with snow scrapers.

The only special equipment on either property consists of snow loaders and automotive trucks equipped with plows, each property having one Barber-Greene snow loader. The loaders are very efficient and economical and we have averaged in an eight-hour day a 5-ton truck loaded every three minutes. We have not used the trucks equipped with plows for plowing the tracks, but simply for throwing the ridges left by the plows and sweepers back into the gutters, where the snow can be handled by the snow loader.

We use salt in switches, and on practically all hills having grooved rail, catch basins and drains salting is begun as soon as the snow begins to fall.

The consumption of salt per mile of track per season for the last three winters was from 1,309 to 2,945 lb. per track-mile in Springfield and from 1,917 to 2,772 lb. per track-mile in Worcester.



Eastern Massachusetts Sweeper Equipped with Leveler

Experience in Snow Fighting on the Eastern Massachusetts

By W. C. Bolt
Superintendent Rolling Stock and Shops Eastern Massachusetts Street Railway
Chelsea, Mass.

EACH one of our thirteen division managers is fully responsible for transportation in his respective districts, including efficient and economical snow fighting. At the beginning of a storm, all sub-department heads are notified and requested to report immediately to the executive in charge, either the division manager or his division superintendent. It is our general plan to start fighting snow as soon as it is possible to man plow equipment. Delay in this respect has been found to be costly, and we very much prefer to operate our snow-fighting equipment early.

All paved track is covered first by sweepers. It is occasionally possible to cover all lines with sweepers and passenger car scrapers without using the heavier snow plows. Should the weather reports indicate a heavy snowfall, heavy plows are likewise placed in service without delay.

At the central headquarters, an accurate log is kept on which is recorded for each route the number of the plows, the time each plow started and the time it returned. It is generally planned to determine the exact location of every plow at least every 30 minutes. Plow crews have instructions to call headquarters by telephone if any unusual delay occurs. An automobile or taxicab is used in event a plow crew has not reported within a reasonable time.

After each storm, a report is prepared by each division manager, one copy of which is forwarded to the vice-president in charge of transportation, and one copy to the superintendent of rolling stock. This shows the hours and miles operated by each unit of snow-fighting equipment, the equipment failures, if any, the approximate inches of snowfall, the time storm began, the time storm ended, lines blocked and serious interferences with service, and an estimate of the total cost.

Kinds of Equipment Used

We have a total of 88 double-track electric snow-fighting units to cover the 635 miles of paved and unpaved track, or an average of 7.2 track-miles per double-track unit. Electric snow sweepers have been found by us to be very efficient and particularly effective in snow storms with temperature under 29 or 30 deg. Sweepers are able to operate on paved track at relatively high speed, to clean thoroughly the street between tracks, and aid considerably in preventing the building up later of so-called "high centers." Sweepers, however, become less effective under heavy wet snow conditions, and it is then necessary to resort to plows. In unpaved track, of course, snow plows are very much more effective than sweepers.

The 23 passenger cars which have been equipped with Root scrapers have performed very satisfactorily. This type of unit replaces a regular passenger car, and at the same time clears the track zone of snow. It can cover more miles of track with one man than any other type of equipment, and is particularly effective in snowfall with temperature under 30 deg.

Our records do not give us information as to the relative cost of operating the several types of equipment. As between plows and sweepers, sweepers perhaps are slightly more expensive to maintain. However, we do not feel that this is an important item.

All of our snow-fighting units with the exception of Root scrapers, are equipped with levelers, and these are used to the maximum extent possible. In heavy, congested traffic, of course, the use of levelers would retard service. It is, however, important to level snow back from the rails as much as possible in order that automobile traffic will not find it necessary to use the tracks and

thereby seriously delay passenger service.

Five of our heavy double-truck work cars have been equipped with steel levelers, 12 ft. long and 3 ft. wide. These equipments have been found most efficient for leveling purposes, and are used almost exclusively at night after each storm.

We also have an electric equipment known as the Sampson Axcess Ice Cutter, which has been effective under certain conditions, particularly where lines have been completely snowed-in. This unit carries a cutting blade, a rotating picker, a main conveyor and a cross conveyor.

Relative Advantages of Rail and Mobile Equipment

We have a rather large complement of equipment which is gasoline driven and not confined to rails, comprising: Seventeen Root scraper attachments for buses; fourteen Good Roads Machinery shear plow attachments for trucks; seven 5-ton Best caterpillar tractors for one-man operation equipped with Sargent steel-nose plows; one 7½-ton Walter tractor equipped with Good Roads Machinery shear plow and Walter center scraper. This equipment is intended primarily to care for the 116 miles of bus lines operated. The seven 5-ton caterpillar tractors have just been purchased, and it is our intention to use these tractors in conjunction with our electric snow-fighting equipment.

There is no question but what gasoline-driven equipment is of considerable advantage in temporarily taking care of a route which may be blocked by a stalled truck or otherwise. Traffic centers and street intersections can best be cleared of snow with gasoline-driven equipment.

Our average annual consumption of salt is approximately 475 tons, or three-quarters of a ton of salt per mile of track. Each plow is equipped with a number of barrels of mixed sand and salt. This mixture is used particularly on grades where iced condition of rail has made traction difficult. A mixture of sand and salt frequently seems to do better work in cutting ice than pure salt.

Cost of Fighting Snow

Our expenditure for fighting snow as recorded in Account No. 12, and expenditures for cost of maintaining snow fighting equipment, Accounts No. 32 and No. 33D, have averaged $198,499 per year for the last six years.

The total annual cost including fixed charges, based upon the average cost of the last six years, is $295,500, equivalent to the revenue from 4,220,000 passengers. Our average annual expenditures for fighting snow including fixed charges would pay 58 per cent of our common stock dividend. Again it would pay our entire annual dividends on the first preferred stock. Twenty-five per cent of our total bond interest could be taken care of if we were not confronted with snow-fighting expenditures. All of these figures refer to the cost of fighting snow with electric plows, and do not include any costs in connection with plowing snow on our bus routes.

Snow Removal in Hartford

By N. J. Scott
Manager Hartford Division the Connecticut Company

RAILWAY operators disagree as to the benefits of snow, and the only real answer to the question is our net revenue. We all agree that our gross is much greater in winter and at times of heavy snow, and if we can help one another to work out economical snow-fighting operation and removal costs it will be to our mutual advantage. The following is the procedure at Hartford, Conn., which has a population of 170,000 and a trading population of at least 250,000. The track mileage is 173.38.

When the storm begins a starter reports at the carhouse where snow-fighting equipment is housed and immediately thereafter crews report to him. Previously all snow-fighting equipment has been put in shape and loaded with salt. Each crew is given a route card and, barring sickness or some unavoidable occurrence, crews are assigned to the same routes and same equipment on each storm. The routes are so arranged as to get the most out of the equipment and the least possible time is lost in changing ends. This practice also improves passenger car schedules.

Starting with the storm again, two dispatchers divide up the lines by telephone circuits and control the movement of the snow-fighting equipment under the direction of the superintendent. Progress and difficulties are recorded at all times. Principals operating the equipment are well qualified for their work and keenly feel the responsibility of keeping their routes open. The crew starter provides reliefs and lunches for the crews as required. We have four double-truck sweepers and two single-truckers. These are used effectively on city routes with improved pavement in handling light snow and in cleaning up after plows. They are also useful in the work of the day following storms in cleaning tracks subjected to the vehicular traffic. Shear plows are used on city and on some suburban lines and are exceptionally good on double-truck operations. The A plows are used on single-track suburban lines, but the side shear plows seem to give better service. We move the snow with the wings and leveling boards as far from the rail as possible, where it is picked up by either truck or tractor and removed further from the rail or to the gutter side. This leaves a good traveled highway, which helps us in subsequent storms and maintenance of schedules, as all vehicular traffic is not forced to the car track.

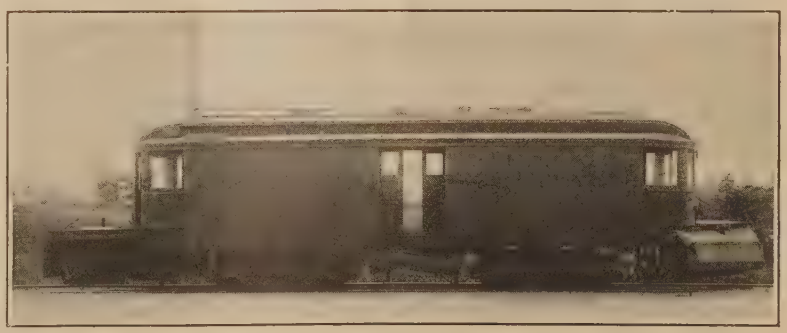
All cars are equipped with snow scrapers and are used to advantage not only at the time of storm but following the storms when vehicular traffic drags so much snow onto the rail and also in cases of slight drifting.

All of our snow-fighting equipment is confined to rails as we have not experimented with motorized snow-fighting equipment except on our own premises. There is no question but that equipment of this type would help in our general snow-fighting program, but we have kept away from it on account of additional burdens that might be placed on us by city, state and municipalities.

We have two cars in our track department which are rigged up to salt track; they also have route cards which cover our grooved type of rail, all switches and low rail in the city area. To my mind there is no question but what the proper application of salt is very essential, especially in heavy snow which is easily matted down by autos. After the salt is spread the snow loosens up and is easily removed by car scrapers or sweepers.

Each switch cleaner has a territory to cover and barrels of salt are placed at various locations on these routes. Each snow plow and sweeper also carries a supply of salt which is used in low spots and on lines not covered by regular salt car routes. The average consumption of salt per year per mile of track the past season, which was a fairly mild winter, was about 1 ton per mile of track.

We are called on to move snow in certain downtown city streets. During the past winter we cleaned 3 miles of streets at an approximate cost of $2,500 per mile, the loading being done by hand, using teams and trucks to cart the snow away. At night we sometimes use a motor flat and trailer. We are unable to dump snow into our sewer manholes in Hartford, but outlets in several bridges allow us to dump snow into the Par River in the downtown section and also in the Connecticut River, where we dump with a very



Former Eastern Massachusetts Express Car Equipped with Broom Sweeper

short haul. In the case of snow trains as described above, the haul is considerably longer and at least 2 miles from the center of the city.

It is my belief that personal contact with the crews and a word of encouragement from time to time when the storm is raging are very helpful. We try to impress on them the responsibility of keeping their routes open.

Snow-Fighting Equipment and Methods

E. L. LOCKMAN
Assistant Engineer Surface Lines, Boston Elevated Railway

HANDLING of snow in a progressive community has undergone a considerable change from what it was some years ago when a certain amount of snow was left on the ground for the accommodation of vehicles on runners.

By law the Boston Elevated Railway is obligated to remove snow from the track area only. If snow is removed from the track area only vehicles will use the car tracks, thus delaying the car service. We find it is not only necessary to remove snow from the track area but also alongside the tracks to provide a roadway for other vehicles.

As time is the essence of snow removal, successful snow fighting calls for prompt, speedy action and special equipment is required.

In 1920 the company purchased its first piece of snow-fighting equipment other than car plows. This was a Champion snow plow. In 1922-23 we purchased our first snow loader. Two weeks after its receipt we purchased a second. We have added to this equipment from time to time. A list of the snow-fighting equipment owned by the company and operated by the maintenance department, exclusive of car plows, is as follows:

9 Barber-Greene snow loaders, 6 caterpillar tractors (5-ton) with steel plows, 3 Fordson tractors, 2 Walter truck snow fighters, 6 Differential cars equipped with snow plows, 3 rail cars equipped with side plows, 32 Champion snow plows for 5-ton trucks.

This equipment has a value of $112,888.

In addition the maintenance department operates 36 motor trucks varying from 7-ton of the Mack and White type to 1-ton Ford trucks. This equipment is used in regular service during all seasons of the year and is available for snow work when required.

CAR PLOWS

The company has a total of 162 single- and double-truck car plows are sixteen sweepers of both single- and double-truck type. The cost of maintaining the car plow equipment during 1925 was as follows: Car plows, $10,263.64; car sweepers, $2,763.49.

The cost of maintaining the Barber-Greene snow loaders, of which we had five in 1925, was $368.08.

From Feb. 5 to 24, inclusive in 1926 the following snow work was performed by the maintenance department equipment:

Cubic yards of snow removed		52,785
Truck loads		7,038
Number of trucks used		650
Average cubic yards per load		7.5
Average cost per cubic yard		$0.4688
Total cost		
Trucks	$18,822.48	
Operators	1,435.34	
Men with snow loaders and at dumps	4,490.44	
	$24,748.26	$24,748.26
No. of locations worked at		84

The average cost per cubic yard of snow includes hire of trucks and labor.

For effective snow fighting we find that a special organization is required both for the transportation department and maintenance department. Every man in the maintenance department, including the engineering force, clerks, etc., is assigned a place and used if the conditions require. The responsibility of handling snow is divided between the transportation and maintenance departments. The duties are responsibility of each department are well defined and understood.

The transportation department plows the car tracks and operates scrapers on the buses if necessary. The maintenance department operates all snow-fighting equipment exclusive of car plows and procures extra trucks from contractors for plowing bus routes, throwing back snow on car lines and for hauling snow; also extra trucks are provided and equipped for emergency and are stationed at several predetermined points on the system. These emergency trucks are equipped with blocks and falls, jacks and other tools for the purpose of removing stalled automobiles and other vehicles which break down on the car tracks. We found during the snow period of February, 1926, that this service was absolutely necessary in order that we might operate our car schedules.

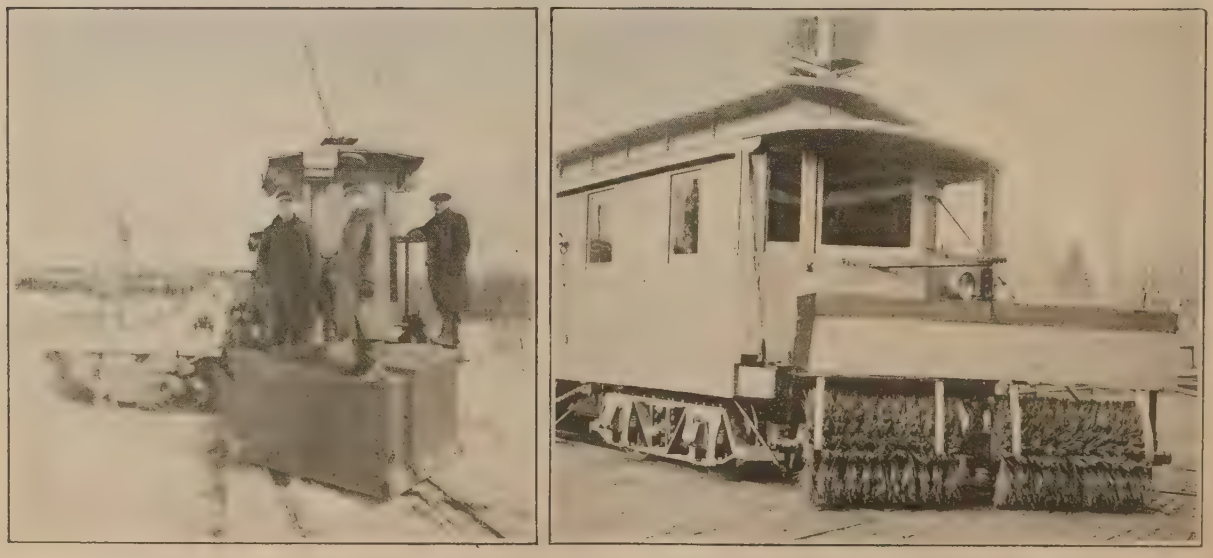
The maintenance department obtains permits for dumps for snow disposal. We have a total of about 60 sewer manhole locations for snow disposal and tidewater dumps located at various points in the system. We have a few land dumps, but land dumps are not desirable in connection with motor truck removal of snow.

To provide extra trucks necessary for snow fighting every fall we send out a questionnaire to local trucking concerns as to the number of trucks available and the price per hour, where located, etc., and during the season 1925-26 we had approximately 250 trucks on our list, available for snow work both for snow removal and for plowing.

During the past season we paid an average rate of $27 per day of nine hours for hauling snow and $36 per day of nine hours for plowing snow.

As before stated, we own 32 Champion snow plows for 5-ton trucks; 25 of these plows are used for hired trucks and seven for company trucks.

In addition to the car plow equipment we have found it desirable to equip certain service cars with side wings for throwing back the snow. We have three rail cars equipped with these



Eastern Massachusetts Equipment. At Left, Leveler with Nose Plow; at Right, Sweeper Rebuilt from Open Car

wings and six Differential steel cars equipped with front plows and we are now engaged in providing these steel cars with side wings similar to the side wings used with the rail cars.

During the heavy snow period of February the rail cars equipped with wings did wonderful work. No matter how deep the snow these cars had sufficient power to throw it back and provide a roadway of from 12 to 14 ft. wide alongside the car track for automobiles and other vehicles. Where streets were not of sufficient width to provide storage for this snow it was necessary to put out the snow loaders and remove it.

As to the relative advantages of equipment confined to rails and equipment not confined to rails, from our experience during the heavy storm of February, 1926, we found it would be necessary to have other apparatus than

Former Eastern Massachusetts Express Car Equipped with Shear Plow

plows and sweepers running on car wheels. When lines become tied up due to stalled cars or other vehicles breaking down on the track, so do plows and sweepers, at which time it is advisable to have on hand some other form of equipment that can go around the block and clear the line ahead for the stalled cars. For this work we believe the Walter snow fighter will be a very effective piece of apparatus.

The Walter snow fighter is in effect a six-cylinder, 80-hp., 7-ton truck of four-wheel drive, equipped with snow scraper blade and front patrol plow, and while it is purchased for use on bus lines it may be used on the system wherever its services are required.

The company also has on hand six 5-ton tractors equipped with steel plows. These tractors are the most powerful snow-fighting outfits we have and their only drawback is their slow motion, but for pushing back an accumulation of snow we believe they are unexcelled.

On tracks and special work we use an average of 2,000 tons of salt per year. As the miles of surface lines operated total 310,408, this is an average consumption of approximately 6.4 tons per mile.

The salt is purchased in bulk and is received in steam railroad box cars at our freight yard and from there distributed by service cars to several points on the system. When occasion requires it is distributed by special salt cars and motor trucks.

If the storm arrives late at night or in the early morning hours it gives us no particular concern. We have a free field for the operation of our snow equipment; but if the storm is of considerable proportion and arrives during the afternoon the situation is seriously complicated.

Before the storm arrives the supervisory forces of the transportation and maintenance departments report to their particular districts to which they are assigned. Station masters, with sufficient assistants, report for the purpose of assigning and detailing plow crews. The maintenance department assigns men to cover special work, passenger landings, rapid transit lines stations and rapid transit interlockings.

When the snow is from 1 in. to 2 in. deep car plows are sent out. If the storm increases in intensity the plow routes are shortened and additional equipment put on as needed.

Motor trucks, properly ballasted and with front plows, are sent out by the maintenance department as previously arranged to throw back snow from where it is deposited by the car plows and also to keep bus routes open. Other motor trucks equipped with jacks, blocks and falls, etc., and known as emergency trucks, are assigned to certain locations to assist the regular wrecking crew in removing broken down vehicles or vehicles that have become stalled on the car lines. Entrances to hospitals, public buildings, police stations, etc., are kept clear of snow.

About three hours after the storm is over, so abutters can clean their sidewalks the maintenance department sends out snow loaders to remove the snow from narrow streets and streets from which it has been agreed to remove one half the snow or from curb to curb. The amount of snow removed depends on the condition of the streets previous to the storm and the weather conditions following the storm.

During the night following the storm and as often as required service cars equipped with special side plows are sent out to throw back the snow toward the curbing. As before stated, this equipment has been found to be very efficient as it provides a roadway of from 12 ft. to 14 ft. in width from the car rail toward the curbs, and in this way we entice the automobile traffic to keep off the car tracks.

After every storm the snow equipment, of whatever type, is returned to its own station for inspection and repairs, if repairs are necessary, and there it is put in readiness for the next storm.

American Association News

Rolling Stock

REPORTS of chairmen of special committees in the rolling stock division outlining the work to be undertaken during the coming year occupied a two-day session of the standing committee on rolling stock held at association headquarters, New York, Dec. 13 and 14, 1926. Those present at the meeting were A. T. Clark, chairman; W. S. Adams, V. W. Berry, W. C. Bolt, W. W. Brown, R. S. Bull, R. W. Cost, F. J. Foote, M. R. Hanna, J. M. Hipple, E. A. Hutchins, J. S. McWhirter, T. H. Nicholl, Hugh Savage, R. B. Smyth, C. W. Squier and W. G. Stuck.

In a review of Manual sections special attention will be devoted to revising that for couplers and the location of end connections on interurban cars. Specifications for gears and pinions will be revised by special committee No. 10 on gearing. It was decided to recommend to the executive committee of the Engineering Association that special committees be formed to take up revision of standard journal boxes and the establishing of additional limits-of-wear standards.

The committee that is studying motor coach design and maintenance methods will go over the specifications proposed by the Society of Automotive Engineers through its motor coach division for the New Jersey Board of Public Utility Commissioners, and it will also review the inspection schedules as published in the 1926 equipment committee's report.

In order to arouse interest in the subject of appearance, comfort and convenience of cars, a study of which is being made by special committee No. 3, a special campaign will be instituted. This will consist of a number of articles by men who are accomplishing particular improvements in the appearance, comfort or convenience of rolling stock on their properties, these articles to be published in ELECTRIC RAILWAY JOURNAL. Others will also be requested to submit letters for publication discussing the subject and outlining what they consider essential.

The study of car lighting being made by special committee No. 4 will include recommendations for the lighting of typical surface cars. Additional lighting tests will be conducted in order to secure data and a report on the number and sizes of lamps now available will be made, together with a list showing the demand for the various types in electric railway car service.

Discussion of results being obtained from roller bearings in European countries brought out that increased interest is being manifested and that the study being made by special committee No. 5 should prove valuable.

Committees which are studying side wear of brushes in ventilated motors, noise reduction in car operation and current collecting devices outlined the work which will be undertaken.

Professor Seligman Addresses Tax Committee

REGULAR and advisory members of the American Association taxation committee were addressed at a luncheon meeting held in the Engineers Club, New York, on Nov. 10, on the subject of the gross-net tax by Prof. E. R. A. Seligman of Columbia University, nationally known economist. Professor Seligman cited experience with this general form of taxation where it has been applied, and recommended it as a means of securing more equitable distribution of the tax load on business.

In discussing the taxation of utilities, and particularly the electric railways, he decried the unfairness of the burden now carried. He pointed out, however, that this was in large part attributable to unwise effort in the past to avoid a fair share of the tax burden. He held that no business could afford to dodge its fair share of taxes, but agreed that utilities are justified in striving to equalize their taxes with those carried by other forms of business.

During a morning session at association headquarters, and following Professor Seligman's talk, the committee discussed the advisability of undertaking a program to stimulate industry-wide advocacy of the gross-net system of taxation for electric railways. It was the purpose of the committee first to determine the sentiment of its own members regarding the principles of gross-net taxation and after that to undertake a study of the practical problems of its application.

There was some difference of opinion as to the advisability of an indorsement of the principle advanced or of advocacy by electric railways of any particular system of taxation. Such an indorsement was finally passed, however, with a number of members not voting. A sub-committee was appointed to make a further study of the gross-net method and to prepare a report on the subject for submission to the committee, and if approved to the executive committee.

Those present included the following; regular members, Chairman A. T. Davison, general counsel Third Avenue Railway, New York City; H. Allen, comptroller Chicago Surface Lines; Robert M. Feustel, president Indiana Service Corporation, Fort Wayne; H. L. Geisse, general manager Wisconsin Valley Electric Company, Wausan; W. A. Jackson, vice-president the Milwaukee Electric Railway & Light Company, L. R. Nash, operating vice-president Stone & Webster, Boston; C. L. S. Tingley, American Electric Power Company, Philadelphia; and W. J. Wright, assistant general counsel Public Service Corporation of New Jersey, representing Senator E. W. Wakelee. Advisory members at the meeting were W. J. Flickinger, Connecticut; A. W. Brady, Indiana; J. L. Swope representing C. D. Emmons, Baltimore; E. M. Walker, Schenectady; H. B. Cobban, Oklahoma; E. B. Griffiths representing A. W. Robinson; E. J. Dickson, Rhode Island; T. J. Moore, Virginia; Managing Director L. S. Storrs, J. W. Welsh, executive secretary, and Leslie Vickers, economist of the association staff.

Parking No Aid to Merchants*

By F. C. Fox
Assistant to President A. I. Namm Company, Brooklyn, N. Y.

THE merchant today is seriously interested in the transportation problems. First, I think, I ought to indict the merchant as being guilty of producing a great part of the present traffic congestion. The downtown shopping district has become an institution. A number of large department stores have been established in one section. We spend millions of dollars annually to bring people to that section from all the outlying districts. We have created this vast movement and, having built up this tremendous congestion, now we are crying for help.

It is not quite right to say that the merchant is selfish and wants his customers to park around the store and in the streets adjoining the store, because he doesn't. We made a check recently to ascertain what benefit we received from the automobiles parked around our place of business. We front on Fulton Street, which, of course, is a two-track street. The rear is on Livingston Street which is likewise a two-track street. We found in the check-up that 75 per cent of our customers came to the district via subway or elevated, 24 per cent arrived by surface cars and 1 per cent presumably walked or came by automobile.

There were 118 automobiles parked from 9 o'clock in the morning until 5 o'clock in the afternoon on Livingston and Hoyt Streets and Elm Place. From those 118 cars 80 customers came into the store, and just think what those 80 customers did to traffic on Livingston Street. They practically eliminated all of the road area except that section of it on which the surface cars were operating, so that these 118 automobiles impeded thousands of people.

We do not desire that condition and we are going to do our part to eliminate it. Congestion that we have helped to create is now undoubtedly seriously interfering with our business. It has become such a serious problem that when the Department of Commerce recently sent out a questionnaire to practically every merchant in so-called downtown shopping districts, these merchants agreed that this congestion is interfering with traffic so seriously that unless something is done the downtown shopping district will soon be a thing of the past.

We are not selfish; we believe in living and letting live, but we are alarmed to see the number of neighborhood stores springing up. A few years ago the grocers, the butchers, and the like, were practically the only neighborhood stores. Now, because of traffic difficulty, we find all sorts of shops, specialty shops, springing up in almost every residential neighborhood in the city. We are perfectly willing to let them have business, but we don't want them to take our business away from us, because in the creation of this business we have made a huge investment in real estate and in building up good will. Decentralization would mean that the money we have spent for the good will and invested in our plant would be seriously jeopardized.

One of our neighbors tried the private parking proposition. A garage was hired and had two uniformed men to take the customers' automobiles from the store to the garage and bring them back again without any charge for the service or for the parking. But such is the selfishness of human nature, that the customers, realizing it would take a few minutes to get the automobiles, that they would be a little inconvenienced by this arrangement, refused to permit it, and the store finally gave it up in despair. Thus the much-heralded means of preventing parking around department stores by providing garage space, I am afraid, is doomed to failure. People simply will not do it.

At the present time there seems to be an insidious sort of propaganda, and I don't know where it comes from, that the street car is the source of all traffic evils, and the remedy proposed is the bus. I may not know much about it, but I think the remedy is a little worse than the evil. As has been said, the street cars stop on every corner, but I suppose the bus will have to stop somewhere too. The street car with its definite lane of travel carries about three times as many passengers as the bus, and it certainly is not causing the congestion that the bus is causing.

Buses are good things, but not good enough to supplant the surface cars. They are good things as auxiliaries to surface cars, but they should be in the hands of organizations skilled in transit. We have had some experience along that line. Once we tried to give some of our delivery to an unskilled organization. The result was chaos and we had to turn it all back to our own organization trained in that business. They soon straightened it out.

I don't believe that putting buses on the streets, particularly on the main thoroughfares, is going to help us very much. It certainly isn't going to help the Police Department very much in controlling traffic, nor the public very much, unless the buses are in the right hands.

I believe if all those interested in the traffic congestion problem will get together with the powers that be, the city fathers and so on, and work out a solution of this problem, they will find a way out. I hope so from a selfish point of view, because if they do not, eventually there is going to be decentralization of the mercantile business. It will have to branch out like the banks, establishing branches in every section of the city. That will not benefit the public, because it will increase the cost of merchandise, and the public is going to pay. From the point of view of a centralized merchant I feel that this traffic problem is so important that all the merchants are right in bending their best efforts and giving all the assistance possible to those interested in improving traffic conditions.

*Abstract of a paper presented at a meeting of the Metropolitan Section A.E.R.A., New York, N. Y., Dec. 3.

The News of the Industry

Merger of East Bay Transit Facilities

Key System Transit Company and Southern Pacific Likely to Merge Lines in Interest of Economy and Efficiency

Important changes in East Bay electric railway and ferry service are forecast by the announcement that the Southern Pacific and the Key System Transit Company, Oakland, Cal., are about to merge all or part of their lines in the interest of economy and efficiency.

Close on the heels of this revelation comes the statement that the Western Pacific is negotiating for the purchase of the Sacramento Short Line and that the stockholders of the latter road are about to vote on this question.

Students of railroad affairs see in these announcements a new development in the contest waged for some time between the Southern Pacific and the Hill interests. The latter are seeking a "place in the sun"; in other words, a new Pacific Coast terminal.

An ideal terminal exists in the East Bay, where the Key mole is located, just a little way up the bay from the Southern Pacific mole. The Hill interests are known to have "flirted" with the Key officials over its prospective purchase. But the Key officials have been wary. Their ferry and electric train service are the best paying portions of their holdings.

To complicate the situation, the Key lines have an agreement with the Short Line by which the latter is permitted to run its trains through the streets of the East Bay and to the mole. If the Western Pacific, through its adjunct, the Sacramento Northern, an electric road, should acquire the Short Line, it would also purchase the right to use the Key mole.

The Western Pacific has a terminal in Oakland, but it seeks a shorter route to the north than it now has. Its auxiliary, the Sacramento Northern, runs between Chico and Sacramento. In the event of the purchase being approved by the stockholders of the Short Line, it is said that the Hill lines, the Northern Pacific and the Great Northern, through their subsidiary, the Oregon Trunk Line, would build a link from Klamath Falls in Oregon to Chico and then run trains over the Short Line tracks to the Key mole.

Officials of all the roads concerned have admitted that the negotiations are in progress and that there is "something doing." Walter Arnstein, president of the Short Line, stated that the stockholders of his road will shortly vote on the matter of the purchase and C. M. Levey, president of the Western Pacific, also admitted that the deal is under way.

Key officials are equally frank, but declare that at the present time plans are tentative. C. O. G. Miller for the Key System Transit Company asserted that surveys are in progress by engineers of the Southern Pacific to determine how some of the duplicate service of the two ferries and electric lines can be eliminated in the interest of efficiency and economy.

Regardless of what plan or plans are finally adopted, it is likely that the ferry schedules of the two lines will be alternated and that commutation books will be made interchangable. This is a plan that has long been considered and one that will meet with popular favor.

Under another plan considered Key System trains will practically cease to run to Berkeley and East Oakland, those two sections being given over to Southern Pacific service almost exclusively. In turn, it has been suggested that the Southern Pacific abandon its Central Oakland service in favor of the Key.

Mr. Miller also admitted that still another plan being considered is one that calls for a merger of the Key and Southern Pacific electric lines and ferries through the formation of a holding company, each line to keep its own operating head. Under such an arrangement, it is pointed out, great economies could be effected and a reduction in rates would probably follow.

It is expected that Paul Shoup, executive vice-president of the Southern Pacific, will have final say as to which of five plans is to be chosen. He has been in the East for some time.

Key officials declare that the recent raise in railway fares from 6 to 7 cents, which was expected to bring more revenue, has failed of its purpose and that no financial relief has been afforded.

Chicago Coach Hearings Start Dec. 21

Motor Interests That Would Supplant Street Cars Want Adequate Return —Say They Cannot Be Silenced by Arrogance—Backed by Big Bankers, Including Seligman and Guaranty Trust—One Side Says It Can't Be Done, Other Says it Can

JOHN A. RITCHIE, president of the Chicago Motor Coach Company, was the chief witness at the public hearing called on Dec. 10 by the committee on local transportation of the Chicago City Council to consider the proposal of his company, submitted to the Mayor and the Council on Dec. 8. This proposal, it will be recalled, contemplates that the motor coach company shall be permitted to take over the functions of the Chicago Surface Lines in supplying comprehensive city-wide transportation in Chicago after the expiration of the railway company's franchise next February.

The discussion on Dec. 10 was preliminary and really constituted the first of a series of hearings on the matter to begin Tuesday, Dec. 21. In this series of hearings it is expected that such points as cost of operation, compensation to the city, capital investment, flexiblity of operation, relative speed, capacity of vehicles, existing litigation, economic use of street space, paving, etc., will be taken up.

Adequate Return Wanted

At the preliminary hearing Mr. Ritchie outlined in general the company's plans. He said that as to the whole contract "the city can write its own ticket, so long as we are enabled to earn an adequate return." Little more than the barest essentials of the plan were touched upon, however, and no definite action or results can be expected until after the investigating committee has delved into the matter thoroughly.

Mr. Ritchie's appearance before the committee drew a vast throng of city officials, Surface Lines executives and representatives of the trainmen's union. By way of preface Mr. Ritchie declared that his company's long experience and financial responsibility qualifies it to undertake this great enterprise. Among the bankers who have approved the plan and stand ready to finance it, he mentioned the Foreman Trust & Savings Bank, Chicago, and the Guaranty Trust Company and J. & W. Seligman Company, New York. The discussion at this meeting followed along much the same lines drawn in the letter originally addressed to the committee, but Mr. Ritchie was kept busy answering the questions and criticisms of the none too credulous Aldermen. He seemed undisturbed by the many queries and objections thrown at him by the Aldermen. At the close of the hearing, he conceded that if provision was made for a reasonable return on the investment, the city could write any kind of a franchise and "we will meet your terms."

Mr. Richardson Answers Mr. Ritchie

Some of Mr. Ritchie's arguments in his original proposal were answered by Guy A. Richardson, vice-president of

the Chicago Surface Lines. He was quoted as follows in the Chicago *Tribune:*

The bus lines so far this year have fallen off 4 per cent in passengers, while the street cars have made an increase of more than 4 per cent. When the novelty wears off the public comes back to the street car the old trustworthy transit, rain or shine sleet or ice, hot or cold.

If buses are to give city-wide service certain things would have to be cared for first. Let me enumerate some of them: greater frequency of buses at ends of lines service at all hours of the day, a greatly increased ratio of rush service to non-rush reasonable head room, pneumatic tires, air brakes for safety, working conditions and wages, heating and ventilating, taxes and street charges for paving. Even the change to pneumatic tires, which would cost 1½ cents a bus-mile, would wipe out the present profit from operation.

If these factors were cared for, as they are by the street car lines, the fare by buses would be closer to 15 cents than 10 cents.

Mr. Richardson discussed the buses in London, which were used as an argument in the proposal of the Motor Coach Company. He is quoted:

Conditions in London and Chicago are not comparable. In London the tramway is the workman's vehicle. He gets a special rate at rush hours. So the buses do not start operating until 8 a.m. and they cut off service, except on main thoroughfares about 8 p.m.

The buses carry the great bulk of the London traffic. But the average ride in London is less than 1 mile, as compared with 4½ miles for the Chicago street cars. They keep hopping on and off in London.

If London buses carried their passengers as far as do the Chicago Surface Lines. London would require three times as many buses as now. London's volume of traffic is on a different basis than there.

They have few private automobiles; traffic is mostly taxis, buses, and commercial vehicles. Tramways are excluded from the old city of London, which is about 12 square miles. The buildings are low, no skyscrapers, the people are more widely distributed, many of them walk to work, they are not centralized as here in the downtown district. Yet last year the London transportation committee curtailed the number of buses on account of the great congestion. So much for London.

Mr. Richardson discussed the Fifth Avenue buses of New York:

The Fifth Avenue Coach Company operates on the finest sightseeing street in the world, yet after 30 years and more as a company it has been able to justify using only about 300 buses in the largest city in the country.

The present speed of buses on Fifth Avenue is less than 4 m.p.h. all afternoon, and between 5:15 and 6:15 p.m., between 32d and 52d Streets it is only 2⅜ m.p.h., or less than a walking gait.

This is not transportation and should be forced off the street to let other fast vehicles have a place. Five subway trains per hour would handle more people than do the Fifth Avenue buses, and at 25 m.p.h. instead of 2⅜. Fancy taking 22 minutes regularly to travel a mile!

The bus company claims it could do the work of Chicago's 3,539 street cars with 4,685 buses. It would be impossible—the load is too high. It would take at least 6,500 buses at a minimum to serve Chicago if paving, street clearances, and so on were arranged so that they could operate.

The price bid by Yellow Coach for such a type bus for Detroit this year was $12,125 without tires. So 6,500 buses at $12,500 with tires would cost $81,000,000. This would represent the investment in buses alone.

The present investment of the Chicago Motor Coach Company, in land, buildings, shops, garages, coaches and equipment necessary for present operation is about $6,900,000. Coaches alone make up about $3,700,000, or about 53 per cent of total necessary investment. The figures are from records on file with the Commerce Commission.

If this ratio holds good, and it should, the total investment needed for a system of 6,500 buses would be about $150,000,000. If there are only 4,700 buses, the total would be at least $110,000,000.

The bus proposal, interpreted by some to mean the wiping out of the entire capital investment of the Chicago Surface Lines without return to the investors, has brought some rather severe criticism. The *Journal of Commerce* said editorially.

The street car lines which Mr. Hertz proposes to supplant are now giving Chicago the best surface transportation of any large city in the world. Of course there is overcrowding and there is straphanging, and some of the motormen and conductors are surly fellows. This, that and the other complaint is true. But the Chicago street car lines are not here being compared with limousines or parlor cars; they are being compared with street car lines in other large cities. And the Chicago street car service is better than that in any other large city.

An enormous number of people are carried at peak hours in the early morning and the late afternoon, and there has to be straphanging just as there has to be a busy signal on the telephone wires at peak hours. The street car public would lose much of its discontent if it could be frequently transported to other large cities in order to experience the service there at the rush hours.

That it would be possible to junk the great surface transportation plant and perform as good a service by buses, does not seem reasonable to the observer.

And yet if it be assumed that all that Mr. Hertz says is true, still there is a moral objection to the junking of the street car lines. There is a plea in equity for the people who have lent many millions of property to give Chicago the best street car system, and whose investment would be destroyed if street cars were abandoned.

Twenty years ago the street car franchises were given. It was then agreed that at the expiration of the franchises on Feb. 1, 1927, the city should have the right to buy the lines at a contract price. Fifty-five per cent of the net receipts was set aside for a traction fund, which would constitute a large part of the price the city would pay for the property.

The obligation now rests upon the city either to buy the property as agreed twenty years ago, or else to permit a continuation of service. Any other course would be an injustice to the investors who twenty years ago, and by means of purchase of bonds since then, have supplied capital which now should either be returned to them by means of city purchase of the lines, or which should be permitted to continue earning returns.

It is unlikely, however, that the moral obligation will be much considered by the City Council. It is one of the axioms of popular philosophy that an investor in a public utility is always a villain, and that every dollar that can be squeezed from him is a dollar laid upon the altar of righteousness. Therefore moral objections to the junking of the street car lines will not count. But practical objections count immensely. Aldermen will be wary about creating a situation in which people who want to go to their work cannot find a way to get there.

MR. RITCHIE ANSWERS MR. RICHARDSON

Officers of the motor coach company were quick to reply to these criticisms. Mr. Ritchie did so in a statement made public on Dec. 13. Another communication was dated Dec. 12. In addition still another statement was made in which some of the reasons were advanced why a city-wide motor coach system "could meet the existing requirements of surface transportation in Chicago better and more quickly than any other form of local service," but in the interest of brevity and avoidance of technicality, other important features were merely mentioned, leaving more detailed consideration to this further letter and "to conferences with your body."

In his statement of Dec. 12 Mr. Ritchie served notice "that we cannot be silenced by arrogance, glittering generalities, and misstatement any more than the people who are suffering because of lack of proper transportation can be silenced by such. The time has passed when deception can triumph." He felt a questioning attitude to be natural, proper and reasonable, but his response to those who said that "it can't be done," namely, furnish a city-wide system to carry all of the passengers now being carried by the street cars, was: "We can do it."

These various communications in behalf of the bus company run to the extent of 24 closely typewritten pages. It is impossible to do more than indicate the scope and the tenor of these statements. Mr. Ritchie replied to several of Mr. Richardson's criticisms and then said that "there would seem to be no reason to analyze in detail the other statements made in the article referred to (the *Tribune* article). It is evident that Mr. Richardson was incorrectly reported or spoke without authoritative data, giving general impressions rather than readily ascertainable facts." At another point Mr. Ritchie said that "whatever opposition modern motor coach service meets is of the kind that was met by the printing press, weaving machinery, great beef-packing plants, elevated railroads, etc., and which always arises to oppose a better way of doing old jobs. Old established interests suffered, but society as a whole is entitled to the fruits of civilized progress."

The general communication, to which reference has been made, says:

A city-wide motor coach system such as we proposed in our letter could, better than any other type of street surface transportation, be co-ordinated with rapid transit lines in Chicago easily, quickly, and without impairment of capital, or the necessity of any large new investment. This can not be said of any other existing type of surface transportation.

The first official confirmation of the plan, to supplant local street car service by putting 4,200 additional buses on the streets of the city was evoked on Dec. 7, when John Hertz, chairman of the motor coach company, held a conference with Mayor William E. Dever for the purpose of obtaining a hearing before the local transportation committee. Representing that such a plan is not only possible but commercially feasible, a letter signed by Mr. Ritchie, president of the company, and seeking to "work out with the committee a complete plan of motor coach transportation for Chicago, which in our judgment, will result immediately in great public advantage," was accordingly laid before the local transportation committee the following day.

The letter of President Ritchie to William E. Dever, Mayor, and the City Council follows:

By reference to the volume published by Al. F. Gorman, city clerk, in November, 1924, entitled "Sundry Proposals and Plans for the Development of Local Transportation Facilities in the City of Chicago," it will be found that on Sept. 24, 1924, we called attention to the fact that the Chicago Motor Coach Company could serve the city of Chicago and its people with greatly improved transportation facilities.

Since that time we have given further study to the subject and are now in a position to work out with you a complete plan of motor coach transportation, which, in our judgment, will result immediately in great public advantage.

Notwithstanding the case now pending in the Supreme Court of Illinois between the city and our company, involving certain legal questions, and having in mind the importance to the city of Chicago of an early settlement of its surface transportation problem, and agreement can be entered into between us which will bring about a prompt solution of the problem. This agreement would be binding on the city and our company, no matter which side is successful in the pending litigation.

Brooklyn City Employees Receive Safety Bonus

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Left to Right, N. R. Nay, James Prundy, William Preisendorfer, Borough President James J. Byrne, Everett Merrill, Michael Ford and John Walker

Approximately 86.4 per cent of the 2,172 motormen, conductors and safety car operators in the employ of the Brooklyn City Railroad participated in safety bonuses distributed on Dec. 15. This was in accordance with the new plan inaugurated by the company on Aug. 1 of the current year, under the terms of which platform employees receive $5 for each 30 days of work completed without a chargeable accident.

Distribution of the bonuses was made at each of the carhouses with appropriate ceremonies, at which C. E. Morgan, vice-president and general manager of the company, and Borough President James J. Byrne of Brooklyn presided.

Failure to report any accident in which the company's cars may be involved is cause for loss of the bonus by the men responsible. In determining chargeable accidents under the terms of the bonus plan, responsibility on the part of the crew is determined by the management after investigation.

Since the plan has been in operation for a period of only four months during the current year, the maximum bonus which could be earned by any employee was $20. During a full year the maximum amount which can be earned is $60. Nineteen of the 1,876 men participating this year received the maximum amount. Of the remainder, 747 men received awards for three 30-day periods, 727 for two periods and 383 for one.

Summarizing the results accomplished, Vice-President Morgan states that accidents of all types were decreased 35 per cent in the month of October from the total of the corresponding month in 1925 and that this rate of decrease is being maintained from month to month.

We propose giving Chicago a complete installation of modern double-deck motor coaches, serving not only the people now served by the Surface Lines, but extending the installation to localities at present without any service.

The motor coaches to be furnished would be of the most recent design, with the upper decks fully inclosed, so that the full seating capacity would be available at all times of the year under any weather conditions.

We propose to furnish a sufficient number of motor coaches so that during rush hours there would be available 290,000 seats as compared to 156,000 seats now provided by the Surface Lines.

In rush hours, because of increased schedules, approximately eight motor coach passengers out of every ten would have seats, compared with present conditions on street cars where approximately four passengers out of every ten have seats.

During non-rush hours, based on the same schedules as present street car operation, our service would furnish 40 per cent more seats than are now provided by the street car system.

Express or "limited stop" motor coach lines would be installed, furnishing quasi rapid transit service, thus saving large numbers of passengers an appreciable amount of time. This type of service is needed, yet it cannot be rendered by any street transportation agency operating on rails.

By reason of long experience and financial responsibility, we feel qualified to undertake this work, and, therefore, ask that full consideration be given this communication.

The modern large capacity motor coach is a more efficient carrier than the street car, due to the marked improvement in construction in recent years. There has been little progress in recent years in street railway systems; the mileage has failed to keep pace with transportation needs, and the present tendency is to avoid adding new mileage. The motor coach, on the other hand, is expanding and interesting the best engineering, economic and financial thought of the country.

The art of motor coach design and construction has developed to the point where mass transportation can be adequately handled by the motor coach. The motor coach has already demonstrated in actual service in London its ability to handle large masses of people, notwithstanding that the type of motor coach used is less in carrying capacity than the type we propose to use.

In London, in 1925, an average number of 5,500 motor coaches, with an average seating capacity of 47 persons, carried 1,671,000,000 passengers, or more than were carried by any other facility in that city; more than were carried by all street car and motor coach systems in Chicago; more than were carried by the entire Interborough Rapid Transit Company's system of subways and elevated railroads in New York City; and nearly twice as many as were carried by all of the steam railroads of the United States together, as reported by the Interstate Commerce Commission. This is mass transportation!

For the proposed city-wide operation in Chicago, the fully-inclosed, double-deck coach will seat 62 passengers and will be designed to accommodate comfortably a small number of standing passengers on the lower deck. The question of increasing the carrying capacity of the motor coach for the accommodation of a reasonable number of standees is a simple engineering matter.

In Chicago the street cars have an average seating capacity of 44, and, in rush hours, carry more standing that seated passengers.

The Surface Lines in Chicago could not carry passengers at present cost except for the large standing loads.

On the proposed system, 134,000 more seats would be provided than are now available on the Surface Lines, with only a small standing load.

In the proposed motor coach system, approximately 80 per cent of the investment would go to provide motor coaches and 20 per cent for garages, repair shops and working capital; while on the Surface Lines only 21 per cent of the investment is in street cars and approximately 79 per cent in other items, only a small part of which is for car barns and shops, the major portion being for track construction, overhead electric system, power plant equipment and other items not needed for motor coach operation.

The total capital investment for the proposed city-wide motor coach operation in Chicago would be less than one-half of the present value of the Chicago Surface Lines as reported by the Board of Supervising Engineers.

The length of the average ride per passenger on the Surface Lines in Chicago is about 4 miles. On the present motor coach system, operating largely on the boulevards, the average ride per passenger is about 6 miles.

The larger volume of business, the flow of traffic to and from the large number of business and industrial centers throughout the city, the large amount of two-way riding, the shorter average ride, together with other factors, all incidental to a city-wide operation, account materially for the difference in the present motor coach and street car fares.

Considering the lower investment and other elements as now existing making up the cost of carrying a passenger, with the advantages incident to a city-wide operation, the cost of carrying a passenger on the proposed city-wide motor coach installation would, under reasonable terms, be approximately the same as that on the Surface Lines.

The cost of street car operation per mile operated is 34.03 cents, and the cost of motor coach operation under our proposed plan would be 34.92 cents.

The trend of public thought in Chicago is toward co-ordination of all local transportation systems. There is also a public demand for additional rapid transit in order that a larger number of our people may enjoy its benefits. The proposed motor coach system lends itself to a co-ordination with rapid transit more readily than any other form of surface transportation.

We favor early co-ordination with rapid transit and stand ready at all times to co-operate to obtain it.

The flexibility in operation of the motor coach makes it possible to rearrange routes in such a way as to bring the people in contact with rapid transit without the delay and expense incident to reconstruction of surface lines.

Such readjustment by the motor coach can be made without impairment of, or increase in, invested capital, which cannot be said of any other transportation agency.

There are many factors which make motor coach transportation desirable in Chicago, touched upon generally in this letter, and which will be further elaborated in detail in personal conference with your transportation committee.

Less street congestion—the total street area covered by 3,539 street cars in operation is 1,443,912 sq.ft. and the total street area covered by 4,685 motor coaches in operation (the number proposed under our plan) would be 1,124,400 sq.ft., a saving in street area of 319,512 sq.ft., or 22 per cent.

No street car tracks, with the accompanying tearing up and laying down.

No trolley poles or overhead wires.

Motor coach service reflects the modern tendency for quality in matters of business and recreation. It provides safe, smooth, comfortable and healthful transportation.

The motor coach is readily adaptable, without material initial expense, to any development of Chicago's comprehensive plan of civic improvement.

No long construction period required. We estimate that a substantially complete service could be ready in six months.

We can install a complete system on the basis of a twenty-year term.

It is the most comfortable city transportation offered the public.

Faster movement through congested traffic.

The breaking down of a motor coach does not delay other motor coaches.

Wire and power house troubles are absent.

Disabled vehicles and other obstacles can be readily passed.

Deviation may be made from regular routes in case of fire, accident, parades, etc.

Fewer accidents, since coaches stop near the curb. The curbs stops make for greater safety, particularly in the transportation of children to and from schools and elsewhere.

Quieter operation.

Advantages to the city's popularity in showing visitors the city under the best transportation conditions.

Whenever it appears to the Illinois Commerce Commission—which, under existing law, has jurisdiction of our service—that

the public will be best served by the carrying out of our plan, we believe that its members will aid in such development and consummation.

The subject of fares, transfers, period of contract, capital investment, extension of routes, the right of the city to acquire, compensation to the city for the use of streets, and many other factors necessary to consider, are matters which have received our thought and attention. We are desirous of conferring with you to work out a plan which will meet with public favor.

Transit Survey in San Francisco

The city supervisors of San Francisco have adopted a motion appointing a joint committee of finance and public utilities committee "to survey and study problems of transportation in this city and county, with particular consideration of early expiration of important street railway franchises, and report recommendations for acquisition of all privately owned street railway lines in operation here and efficient consolidation of such lines with the Municipal Railway." The resolution relates to the important Market Street Railway franchises which the city claims expire in two years and the company in four. The joint committee is empowered to appoint a citizens' advisory committee.

Seattle in Crisis

Taxpayers Who Maintain Interest in Municipal Railway See Affairs of Road Hopelessly Involved—Mayor Favors Refinancing and Would Buy More Cars

UPON request of S. B. Asia and the "fourteen taxpayers" who have maintained a lively interest in the affairs of the municipal railway at Seattle, Wash., City Comptroller H. W. Carroll has furnished data which Mr. Asia says show the lines to "have reached a crisis financially." Although $4,236,500 has been paid on the bonded debt, accrued depreciation is estimated to total $4,794,688. Mr. Asia also points out that the railway's financial dilemma is further aggravated by the fact that it went on a warrant basis on Dec. 10 to pile up funds to meet approximately $1,150,000 in bond principal and interest due on March 1.

Mr. Asia further points out that the railway must reimburse the Puget Sound Power & Light Company to the extent of $600,000 for taxes paid on railway property for the year 1919 and interest, together with court costs. He states this liability will increase the deficit from $769,427, the amount now recorded, to more than $1,300,000.

As for the accrued depreciation amounting to $4,794,688, for which no sinking fund provision has been made, this is declared to mean that when the useful life of the plant is ended there will be no funds to replace it, because the laws of this state prohibit the issuance of bonds for replacement purposes. Mr. Asia said:

> I maintain that it is the height of folly to assume that the railway is making good when the facts are that there is a large deficit, or excess in liabilities over assets in the railway fund, and that this deficit is increasing daily. While bond installments are being paid, working capital on hand is diminishing each year as the deficit grows, and no funds are being laid aside for replacement of plant.

MR. ASIA'S SEATTLE SUMMARY

Date	Deficit	Surplus
April 1, 1919 (5c. fare)	$70,453.82	
April 1 to Dec. 31, inc., 1919 (5c. fare)	507,425.92	
Year 1920 (5c. and 6¼c. fares)	1,236,283.60	
Year 1921 (6¼c. and 8¼c. fares)		$226,588.29
Year 1912 (8¼c. fare)		710,083.95
Year 1923 (5c. and 8¼c. fares)	107,868.14	
Year 1924 (8¼c. fare)		369,430.78
Year 1925 (8¼c. fare		25,746.01
Year 1926, first nine months (8¼c. fare)	179,244.67	
	$2,101,276.15	$1,331,849.03
Net deficit September 30, 1926		769,427.12
	$2,101,276.15	$2,101,276.15

On the other hand, Finance Chairman E. L. Blaine of the City Council, pointed out that on Dec. 31, 1920, the city railway fund had a deficit of $2,100,537 brought over from Division A and growing out of the first 21 months of operation on an inadequate fare. Five years later, on Dec. 31, 1925, this deficit had been reduced to $590,182, a total reduction of $1,510,354, he states.

On Dec. 31, 1920, bonds to the amount of $17,315,000 were outstanding. Five years later this had been reduced to $14,299,500, a net reduction of $2,915,500, despite the issuance of additional securities between these dates, Mr. Blaine claims. The actual payment on bonded indebtedness during this period was $4,846,191.

In addition to the above decrease of $1,510,354 in the deficit, according to Mr. Blaine, and the net reduction of $2,915,500 in the capital investment, the system paid $5,606,000 in interest, making a total payment of $10,031,854 over and above all operating, maintenance and other overhead expenses. He said:

> I submit that this is a pretty good showing for a business that is approaching bankruptcy. All this has been accomplished in spite of persistent attempts to discredit the system on the part of those agencies in the city which should be interested in building up rather than tearing down the industries of the city and whose very existence is dependent upon adequate transportation being furnished our citizens.

Just prior to the announcement by the Clearing House of Seattle that it would refuse to cash railway warrants, Mayor Bertha K. Landes issued a statement on the railway situation in which she made the following three recommendations:

1. The railway system should be refinanced.
2. Economies in operation should be adopted.
3. Revenues should be increased by improving service, principally by the purchase of 80 new street cars.

The Mayor added that she wished to confer with the chairmen of the finance and the utilities committees of the Council on refinancing of the lines. The Mayor was quoted as follows:

> Increasing revenues are a very necessary factor in solving the problem of even reasonable financial stability for the system. The only way to increase revenues is by speeding service and creating more express routes for the outlying districts.
>
> The way to do that is by buying the 80 new street cars. I feel like urging you to consummate this deal quickly if our interests can be quickly taken care of, bearing in mind that the proposed cars are a vital part of the new program for successful operation of the railway.

On Dec. 10 the city of Seattle cashed the payroll warrants of more than 2,000 railway employees. Two days before the payrolls were due the Clearing House had refused to cash the municipal railway warrants. Finally, Mayor Bertha K. Landes and members of the City Council arranged for a loan of the necessary funds from the city light department. It was found that the city light department has on hand about $1,200,000 in cash, and the water department fully half as much representing proceeds of bonds sold for construction work. By borrowing from the fund, it was pointed out, the railway is helped and the light department will profit, for the railway warrants bear 6 per cent interest. Before this plan was made public, the Mayor received an offer from Rhodes' department store to cash the $130,000 of railway warrants.

In a belated effort to meet the emergency, members of the City Council advanced two proposed plans for refinancing the railway. Of the two refinancing plans favored, one is to induce the Stone & Webster interests, from whom the railway was taken over, to grant an extension of time on the railway purchase bonds; the other is to issue long-term refunding bonds sufficient to pay off the present bonds. At the present time the city pays $833,000, annually on the principal. This sum with interest brings the payment to approximately $1,500,000. If the bondholders are willing to grant an extension of time, to permit a payment of not more than $500,000 annually, E. L. Blaine, chairman of the City Council finance committee, states the line could be made to pay.

If the refunding plan is attempted, the city must first go to the Legislature for authority to float such an issue. The city owes approximately $10,835,000 on the $15,000,000 purchase. It would be necessary, therefore, to issue $10,835,000 in refunding bonds to pay off the present outstanding bonds. The refunding bonds, so Mr. Blaine pointed out, would be on a 50-year basis.

LEGISLATIVE AUTHORITY NECESSARY

In the meantime the Council expects to adopt suggestions of D. W. Henderson, superintendent of the railway, that will further reduce operating expenses. The changes affect nearly every car line in the city and will result in an estimated annual saving of $300,000 in operating costs. The plan contemplates speeding up of service by rerouting lines through the downtown district to reduce congestion. The basic idea is to make street car riding more attractive by more frequent service, chiefly through the operation of loop cars during the early morning and late afternoon rush periods. Except in one or two minor instances, no curtailment of service is proposed. Unlike the plan proposed by Clark R. Jackson, superintendent of the public utilities department, Mr. Henderson's program does not call for looping back of all North End and Capitol Hill car lines at Pike Street. Mr. Henderson estimates that the saving in operating costs due to rerouting will be $156,364 a year, without any reduction in regular service.

Increased Rates in Petersburg Sought—Buses to Operate

The Virginia Electric & Power Company recently filed a petition with the State Corporation Commission for a general increase in transportation rates in the city of Petersburg, Va. The case has been set for a hearing on Dec. 21. It is stated in the petition that the company is planning to start the operation of buses in Petersburg on Jan. 1, 1927, in connection with its railway system. The company asks that the following fares become effective on that date over its railway and bus system in the Petersburg division: Cash fare, 7 cents; tokens, four for 25 cents; school tickets, 3½ cents. There will be no charge for transfers. Rates in force at present are: Cash fare, 6 cents; tokens, five for 25 cents, and school tickets, 2½ cents.

The company further declares that it plans to operate buses under an ordinance passed by the Petersburg City Council on Nov. 16 containing regulations for bus operation in that city. It also plans to replace railless cars on Sycamore Street with buses.

More Pay for Employees, Says Paper

The San Francisco *Chronicle* of recent date stated that the finance committee of the Board of Supervisors paved the way for an increase of 40 cents a day for clerks, car repairers, trackmen and janitors employed by the San Francisco Municipal Railways, San Francisco, Cal. This was accomplished by transferring $50,000 from the 1926-1927 budget to reimburse the city lines for funds borrowed to aid in constructing the Twin Peaks and Stockton Street tunnels. Chairman McSheehy pointed out that all of the $50,000 would not be used in meeting the proposed pay increases, but would guarantee the road against a deficit. Wages now received by the employees are as follows: Clerks, $185 a month; trackmen, $5.40 a day; car repairers, $6.40, and janitors, $145 a month. Several hundred will be affected by this change.

No Accident Bonus Plan Announced in New Jersey

As an additional incentive to careful driving on the part of car and bus operators, the Public Service Railway and the Public Service Transportation Company, Newark, N. J., on Dec. 3 put into effect a "No Accident Bonus Plan."

Under the plan $1 will be credited to each operator for every week of the fiscal year in which his accident record is "clear"; that is, in which no accidents are charged against him. The first bonus will be paid him in a lump sum on or about Dec. 15, 1927, and each year thereafter, so that it will provide a welcome Christmas fund. If the operator's record is clear for the entire fiscal year he will receive $60 instead of the $52, to which he would be entitled under the letter of the offer.

A continuing record for each reporting operator will be kept in every carhouse and garage from which cars and buses are operated. Especially constructed blackboards will be used for this purpose. They will carry the name of every operator reporting at that particular carhouse or garage. For every week of the current month in which he has had no accident a white star will be placed opposite the operator's name and a red dot, red to indicate danger, for every week in which one or more accidents are charged against him. A cumulative record of white stars, red dots and bonus earned will also be kept for every man.

In addition, at the expiration of the year, the name of every operator who has gone through the twelve months with no accidents will be permanently painted on the board, the list constituting the house or garage honor roll.

"L" Rent Put at $900,000

The proceedings before the Pennsylvania Public Service Commission on Dec. 10 on the matter of an "L" rental were adjourned by Commissioner Benn. Counsel for the Philadelphia Rapid Transit Company and protesting parties were instructed to file briefs and prepare to argue the case not later than February, 1927.

The outstanding testimony of the hearing was that of ex-Service Commissioner Scattergood, who stated that the Philadelphia Rapid Transit Company could operate the city-built Frankford elevated line at a substantial profit and still pay the city a flat rental of $900,000 a year during the 30-year term of the proposed lease. He based his analysis of the earning capacity of the Frankford road upon figures submitted by the company. He said that proper consideration of the increased earnings through short-haul traffic on surface lines in the northeast section, due to the elevated operation, would establish the city's line as a consistently profitable utility.

Coleman J. Joyce, chief of the Rapid Transit Company counsel, objected to Mr. Scattergood's testifying as an expert, but was overruled by Mr. Benn, who said that the witness was as fully conversant with utility matters as any man on the bench. At the conclusion of the hearing, the commission instructed W. K. Myers, president of the railway, to forward his estimates of the rentals due the city each year in the proposed lease. That exhibit, which the Philadelphia Rapid Transit Company officials declared would differ materially from the figures submitted by City Comptroller Hadley, will be open to rebuttal by the protesting parties.

Pittsburgh Trainmen Receive Increase of 1½ Cents an Hour

At its regular meeting on Dec. 7, the Pittsburgh Traction Conference Board approved the item in the Pittsburgh Railways budget for 1927 which included the increase of 1½ cents an hour in the rate of pay of trainmen, effective Jan. 1, 1927. The contract with the men does not expire until May 1, 1928. As was stated in the ELECTRIC RAILWAY JOURNAL of Dec. 11, page 1062, the increase is considered economically sound because of the many economies the men have instituted or helped to put into effect.

New Rates in Knoxville

The Tennessee Public Utilities Commission has approved a new schedule of rates on the lines of the Knoxville Power & Light Company, Knoxville, Tenn., effective Jan. 1. It provides for selling six tokens for 30 cents, a weekly pass good for any number of rides for $1.25 or 10 cents a ride for all who do not have tokens or passes.

Another Move in Jacksonville Franchise Issue

A tentative franchise for the Jacksonville Traction Company, Jacksonville, Fla., is to be prepared and submitted to the laws and rules committee of the City Council and the citizens' committee, from which a new bill of privilege is expected to be procured. This decision was made at a joint meeting of the two committees held in the City Hall on Nov. 30. A series of meetings is to be held, in which J. P. Ingle, manager of the company, will participate. It was his belief that the franchise, after it is prepared, should be submitted to the voters to decide. He announced that the company plans to spend $750,000 on extensions and improvements to the service if a proper franchise is granted by the city.

Radial Agreement Submitted

The draft agreement between Toronto and the Ontario Hydro Commission for the transfer to the former of the Hydro radials was submitted to the board of control by the City Solicitor on Dec. 1. Objection was taken by the board to one clause providing that any property of the Toronto & York Radial Railway, which is not being transferred by the agreement, be still in the name of the Toronto & York Radial Railway. The city will deliver to the commission such conveyances, transfers and bills of sale as may be necessary to vest in the commission all property not being transferred by the agreement and which shall then be in the name of the Toronto & York Radial Railway.

It was suggested that the foregoing clause be taken up with the commission to have the agreement before the City Council with the agreement transferring the property to the Toronto Transportation Commission.

The agreement states the original purchase price and the amount spent in rehabilitation of $2,375,000 and $1,200,000, respectively, but leaves blank the further amounts to be paid by the city. The commission will secure cancellation of the $1,200,000 bonds issued by that body, the city taking over the liability and leaving, finally, only $2,375,000 bonds for the purchase, issued by the commission for the redemption of which the city will be responsible. The commission will hold the city's bonds to this latter amount as security for payment. The commission will continue to supply power at rates charged to similar enterprises with an indemnification of the city against loss. A complete transfer is provided for and a single arbitrator will adjudicate on any disputes arising in the future.

Philadelphia Rapid Transit Within Its Rights

Much has been said in the newspapers of Philadelphia in the last ten days about the inadequacy of the service furnished by the Philadelphia Rapid Transit Company on its surface lines. One of the charges is that a deliberate effort is being made to promote the use of the more costly cabs at the expense of the trolley service. In consequence the *Ledger* has reminded its readers:

In all consideration and discussion of transit service at this time of peak loads, due allowance must be made for the difficulties the company encounters during bad weather. It is admittedly hard to maintain schedules when ice and snow block the tracks.

It must also be remembered that the traction company is within its rights in urging the use of its cabs. It is not within its rights if it is promoting the use of its taxicabs by curtailing car service at the expense of the regular car riders.

The P. R. T. protests that this charge is both unfair and unfounded. Nevertheless, thousands of Philadelphians have the impression that it is true. It has been made for weeks by city and suburban car users. It should be the first business of the P. R. T. to eradicate that impression.

Traffic Jams May Require Rerouting

Rerouting cars of the Birmingham Electric Company as a means of eliminating congestion in the down-town district may become necessary in Birmingham, Ala., according to Ross W. Harris, traffic expert in charge of Birmingham's traffic survey. As a result of the recent rapid growth of the city the down-town streets are very badly congested. Mr. Harris will require a number of months in completing his survey and will then offer a solution.

Modified Franchise Recommended in Kansas City

The special franchise committee of the City Council of Kansas City, Mo., at a meeting held on Dec. 11, recommended a modified franchise, providing an income of $2,000,000, based on 8 per cent earnings on a valuation of $25,000,000. The modified franchise recommendation will be submitted to the Council immediately, although action probably will not be taken before Dec. 20. William G. Woolfolk, president of the new company, agreed in principle with the report, and representatives of the railway will act with the committee when a committee is chosen later to work on the actual draft of the franchise document.

The recommended franchise, which is for 30 years, provides that when the earnings of the company exceed 8 per cent, reductions are to be made in the ticket fare at the rate of ⅛ cent for each $100,000 gain in the net annual income. The fare at present is fifteen tickets for $1. An expenditure program of $6,600,000 is required, half in rehabilitation and half in new improvements and extension. An 8 per cent return will be allowed on the money spent for improvements.

It is recommended that the street railways in both Kansas Cities shall be operated as one system, including uniform and universal fares and transfers. The city will have two members on the company's board of directors instead of five, one of whom will be the city railway commissioner, who will have the power to determine what part of the expenditure shall be classified as repairs and what as improvements.

It has been pointed out by lawyers in Kansas City, Mo., that the proposed franchise is really not binding but is a "gentlemen's agreement," the Missouri Public Service Commission having the final control.

News Notes

Answers Filed in Fare Action.—Counsel representing the cities of Niagara Falls and North Tonawanda and the village of LaSalle has answered the equity action brought in the United States District Court at Buffalo by the International Railway, Buffalo, N. Y., seeking to restrain the municipalities through which it operates local and interurban lines from interfering with the collection of a proposed new tariff of higher fares. The action also names the New York Public Service Commission as one of the co-defendants. The three municipalities which have replied to the equity action deny the present rates are confiscatory. They also say the federal courts have no jurisdiction and that the fare question rests with the Public Service Commission.

Hears Fare Petitions.—Commissioner Van Voorhis of the Public Service Commission conducted a hearing on Dec. 15 on the petitions of the Black River Traction Company and its subsidiary, the Watertown Transportation Company for permission to increase fares in Watertown and to discontinue the sale of round-trip tickets between Watertown and Glen Park for 15 cents. Evidence was presented showing a loss of $12,996 in the operation of the traction company in 1925 and a profit of but $588 in bus operation and that about the same result was expected in 1926. The city of Watertown waived the fare restriction of the franchises granted these companies and on March 21, 1921, permitted a 7-cent fare. On March 15, 1926, application was made for an increase to 10 cents or seven tickets for 50 cents, which was granted Oct. 18, 1926, subject to the approval of the commission. There was no opposition to these petitions.

Campaign Urges Patrons to Buy Tickets.—The Georgia Railway & Power Company, Atlanta, Ga., is making a drive to induce patrons to buy tickets by the week. Through different advertising mediums it urges the purchase of a "dollar's worth" of convenience. Patrons are urged to hand the conductor a dollar bill and get fifteen car tickets in exchange, or, better still, to buy a week's supply from the street conductor or at any of Jacob's stores before boarding the car. In other advertising matter the company says: "Buy your week's supply of tickets and forget about fares for the rest of the week. It's budgeting street car expenses just like you budget the rest of the items in your daily life." It is hoped that this campaign on the "dollar's worth" tickets will result in material increases in sales.

Would End Skip-Stop System.—An effort is being made to have the City Council of Baltimore, Md., take part in a campaign being waged by some organizations and individuals to end the skip-stop system that has been placed in operation during the morning and evening rush hours by the United Railways & Electric Company. One of the members of the Council has introduced a resolution which requests the Maryland Public Service Commission to order the railway to discontinue this plan of operation. The resolution makes the claim that the skip-stop is "a great inconvenience to the general public and has done little to speed up traffic."

Wage Agreement Effected. — The Montreal & Southern Counties Railway, Montreal, Que., has concluded an agreement with its trainmen for three years, effective as from Sept. 1. Trainmen in passenger, baggage, express and work car service will receive 45 cents an hour for the first year; 49 cents for the second year; 50 cents for the third year and 52 cents for the fourth year. Conductors and motormen in freight and snow plow service will receive 50 cents for the first year; 52 cents for the second year; 54 cents for the third year and 55 cents for the fourth year. The rates were recommended in the majority report of the board of conciliation and investigation appointed to consider the dispute between the management and employees.

Elimination of "Death Crossing" Expected.—The elimination of "Death Crossing" on the Illinois Traction System west of Edwardsville, Ill., where eleven persons have lost their lives during the past four years, was brought a step nearer when a jury in the Madison County Court fixed an award of $1,500 as the amount to be paid the Tetherington estate for land needed by the Illinois Division of Highways to construct the southern approach to a viaduct to eliminate the grade crossing.

Higher Fares Increase Receipts.—Cash fares received on the Municipal Railways of St. Petersburg, Fla., on the first day of operation under the 7-cent rate showed an increase of approximately $240 over those on the last day of the 5-cent limit. No definite comparisons could be made, it was stated, until the 12,000 tokens sold at the old rate and now being used by patrons were returned. The total receipts of the municipal railways on the first day of the month, when the 7-cent fare went into effect were $1,070 in cash fares; $67 in token sales; $118 in school children's tickets and $175 in cash fares on the buses, in addition to transportation of 65 passengers on tokens and 204 school children.

Greetings and Party in New Brighton.—The Beaver Valley Traction Company is giving its Sixteenth Annual Christmas Party on Tuesday, Dec. 21, at Junction Park, New Brighton, Pa. On a Yuletide greeting card, the invitation is forwarded for a good time to be had from 7:30 to 1. A Christmas party in New Brighton is part of the tradition of the company.

Recent Bus Developments

Fare Readjustment Sought

New Jersey Company $1,600,000 Behind on Operation of Bus Subsidiary —Seeks Traffic Changes

Readjustment of fare zone limits on ten bus lines, five in Newark, calling for an additional fare where a city line is crossed, and a fare zone change on the Bloomfield trolley line are provided in a schedule filed on Dec. 15 by the Public Service Railway and Public Service Transportation Company, Newark, N. J., with the Board of Public Utility Commissioners to become effective on Jan. 1.

PRESIDENT MCCARTER STATES THE CASE

The petition is signed for both companies by Thomas N. McCarter, president. It declares that "the problem to be decided by the board representing the public and the companies is whether fares should be immediately increased sufficiently to make these properties self-supporting, or whether other measures should and will be undertaken either to make a fare increase unnecessary or to lessen the amount of any necessary increase in fare."

The readjustment of zones, with the attendant increase in fares to a considerable number of riders, is only one of several measures suggested by the companies for eliminating the financial troubles connected with the operation of the transportation system in the various sections of the State. These included a further and more completely co-ordinated service; relieving the company of paving obligations; relief from charges for snow removal, street sprinkling and oiling; better regulation of traffic; institution of a better type of bus service; a reduction of taxes.

Five of the lines are in Newark and five outside the city. On the Newark routes a 5-cent fare has been charged, regardless of the fact that the end of the line was beyond the city limits. Under the proposed rate a 5-cent fare would be collected from passengers riding to the city limits and an additional 5-cent fare from all those riding beyond. Other lines affected similarly are those between Elizabeth and Roselle and between Paterson and Hawthorne. On lines between North Newark and Passaic and between Elizabeth and Kenilworth the fare for through passengers would be increased from 10 to 15 cents.

RAILWAY TAX COLLECTOR FOR PUBLIC

A statement made by the companies says in part:

In New Jersey the railways are practically tax collectors for the public, the riders on the car paying the taxes. These companies pay a franchise tax of 5 per cent of their gross receipts. In addition, they pay local taxes on real estate and personal property, the railway paying a gross receipts tax at the average state rate in lieu of its tax on personal property. These, of course, are in addition to federal taxes. Such high taxes are not assessed against any business in the country other than utility companies. These two companies are paying taxes amounting to approximately $2,740,000 a year.

All passes and reduced rate tickets of every kind and description should be abolished. If the rates charged permitted the companies to earn the full cost of service, passes and reduced rate tickets might be favored on the ground of public policy. But while these companies are attempting to maintain the 5-cent fare, which experience has shown to be too low a fare to provide the full cost of the service, losses should not be increased by carrying a certain class of passengers at a still lower rate of fare or for nothing.

All the above measures are in the public interest but cannot be made effective without the assistance and co-operation of the public authorities. They must be effective before the public can obtain the benefit of a completely co-ordinated and unified system of local transportation. Their adoption furnishes the only hope of supplying the public proper and adequate service at the lowest rates of fare consistent with such service.

When the railway instituted the 5-cent fare experiment at the request of the board, the company had filed a 10-cent rate. A higher fare than at present obtains is justified by experience, not only here but generally throughout the United States. The fare on buses in New York City and Philadelphia is 10 cents. The railway fare in most other places throughout the country is higher than that charged by this company, the average throughout the country being 7.7 cents. In New York City where the fare is 5 cents, a substantial part of the cost of operation is provided through general taxation.

Attention is then called to the fact that since the inauguration of the 5-cent fare the railway has failed to pay operating expenses and fixed charges with no return upon the money invested in the railway company by Public Service Corporation of New Jersey, and that Public Service Transportation Company has failed to earn operating expenses and fixed charges during this same period by more than $1.600,000. "Neither the board nor the public can expect this state of affairs to continue," declares the petition.

Ordinance Would Protect Louisville Railway

A direct result of the announcement on Dec. 6 of the plans of the Peoples Transit Company to establish a bus line on Broadway, Louisville, Ky., in competition with the Louisville Railway has been the introduction of a regulatory ordinance before the City Council. This measure would bar buses and jitneys from streets containing car lines, or streets paralleling car lines for a distance of three blocks to each side, thus giving the traction company protection along its own line and closing adjoining property served by the line. The proposed new ordinance would also place restrictions on bus companies, regarding the amount of insurance, bond or similar protection that would have to be given the public, as protection against personal injury and property damage.

No action is expected on the ordinance until the latter part of the month. In the meantime it is understood that the new bus company is getting ready to start service directly. The new line is to use Mack buses, at least on its first unit installations.

Twin City Operation Explained

President Lowry Tells the Story of Co-ordinated Service Before Local Real Estate Board

Street cars will never be superseded by bus lines, says Horace Lowry, president of the Twin City Rapid Transit Company. He was speaking before the Minneapolis Real Estate Board, Minneapolis, Minn., on Dec. 9 in the first official review of the operation of railway and bus lines by the Minneapolis Street Raliway and the Twin City Motor Bus Company. This last-mentioned company, an auxiliary, has two crosstown bus lines connecting intersecting trolley lines on Lowry Avenue and 38th Street and a gas-electric bus line supplementing trolley service on Nicollet and Hennepin Avenues.

Mr. Lowry said that the present rate of railway fares in the city yields just about the 7½ per cent return authorized by the Minnesota Railroad and Warehouse Commission. These rates of fare, 8 cents cash and six tokens for 40 cents, amount to an increase of 13 per cent over the old rate, which was 6 cents flat. On the other hand, passenger traffic has decreased 8 per cent, but fewer automobiles are entering the heart of the city than a year ago.

The bus lines have been operating only a few weeks. The gas-electric line does not compete with the railway. It is showing a profit at a 10-cent fare. Receipts of the crosstown bus lines, run at the same fare as the trolleys with transfers, are not yet up to operation cost. The gas-electric line, without transfers, is taking in about 38 cents a bus-mile on an operating cost of about 25 cents. The crosstown lines are operating at about the same cost, the Lowry Avenue line returning 13.1 cents a bus-mile and the 38th Street line 20 cents.

In Minneapolis the street cars bulk about 18 per cent of the vehicular traffic but carry 76 per cent of the travelers.

In prospect for 1927 is a line across the new Ford bridge connecting the two cities over the Mississippi River and two car lines now reaching to the bridge in either city. Eventually there will be another crosstown line on 42nd Street, the farthest south now being Lake Street.

Proposed bus service for what is known as the Bryn Mawr line extension into a part of the city now being developed seems remote as the park board desires to collect a fee for the use of the parkways to compensate for the additional burden on the roadways from operation of buses. Mr. Lowry said this had been found impractical by the state commission as it would permit any town to levy taxes on buses passing through and would upset the entire state rate structure in the present system of state licensing of buses.

Bus Lines Authorized.—The Public Service Commission granted a certificate on Dec. 14 for the operation of bus lines in the city of Rochester and the town of Gates, Monroe County, to the Rochester Railways Co-ordinated Bus Lines, Inc.

Another Bus Proposal for Buffalo

Ernest M. Howe of Detroit, whose 5-cent bus plan in Buffalo collapsed last spring, has outlined to Mayor Frank X. Schwab a proposal for the operation of a fleet of 25 buses in Buffalo over three lines at an 8-cent fare. In his statement giving publicity to the new Howe bus proposal, Mayor Frank X. Schwab of Buffalo said that the American Car & Foundry Company had notified him that it would finance the new bus lines in Buffalo for Howe and his associates, who will operate under the name of the Buffalo Bus Corporation.

Sufficient capital to start the operation of 25 buses on three lines in Buffalo has been secured and Mr. Howe and his associates have indicated their willingness to post a bond of $25,000 to insure the city that they will carry out every detail of the new plan to operate buses in competition with the local lines of the International Bus Corporation, a subsidiary of the International Railway, both of which are under Mitten Management of Philadelphia.

Application will be made to the City Council by Mr. Howe and his associates for a franchise on the three proposed lines and then the application will be taken before the Public Service Commission for the necessary approval. One of the largest makers of buses, it was stated by Mayor Schwab, will lend its financial support to the Howe plan and will appear before the state utilities board in support of the 8-cent bus lines. The International Bus Corporation charges a 10-cent fare on its three local lines in Buffalo.

Bus Plans for Suburban New York Maturing

The County Transportation Company, Inc., Port Chester, N. Y., petitioned the Public Service Commission on Dec. 10 for a certificate for the operation of bus lines in the village of Port Chester and the town of Rye, Westchester County. The routes indicated are from Liberty Square to North Main Street, Putnam Avenue, North Regent Street, Irving Avenue, Breckenridge Avenue, Fairview Avenue, Monroe Place and Westchester Avenue, returning to Liberty Square and also from Liberty Square to Westchester Avenue, South Regent Street, Boston Post Road and South Main Street to Liberty Square.

Negotiations have been under way for some time between the trustees of the village of Port Chester and the railroad as to the operation of railway and bus lines and public hearings were held on Nov. 1, 9 and 15. As a result the board of trustees adopted a resolution on Nov. 15 consenting to the abandonment of railway lines and the substitution of buses therefore. The resolution provides in addition for an annual payment to the village of 3 per cent of the gross receipts of the entire routes, that operations will begin within 60 days after a certificate has been granted; that present equipment is to be removed from the streets; that the fares will never exceed 10 cents with transfer privileges, and that the franchise will be for ten years from the date of certificate issued by the Public Service Commission.

The County Transportation Company, Inc., also filed a petition with the commission for authority to issue 250 shares of its capital stock of the aggregate par value of $25,000 and petition was also made by the New York & Stamford Railway for authority to purchase the Transportation Company stock and to pledge it as collateral security. Hearings will be held on the three petitions.

Transfers with Railway Suggested in St. Louis

The People's Motorbus Company of St. Louis, Mo., through its attorney, Robert Burkham, on Dec. 2, offered to work out with the United Railways a plan for interchange of transfers from the Kingshighway route of the bus company to and from the various street car lines connecting with it. The offer was made at a meeting of the rapid transit committee of the Board of Aldermen. It meets a suggestion contained in the Rapid Transit Survey recently made public by E. R. Kinsey, president of the Board of Public Service, and C. E. Smith, consulting engineer for St. Louis. Mr. Smith, who favors co-ordination of bus and street car service, declared the suggestion if adopted would be "one of the most important events in the transportation history of St. Louis."

Col. Albert T. Perkins, general manager of the United Railways, has declined to comment on the suggestion until he has had an opportunity to study it. The United Railways is in receivership and under the rules of the federal court, which has jurisdiction, the receiver is not permitted to accept less than the regular fare fixed by the Missouri Public Service Commission. The present car fare is 7 cents, while the bus company charges 10 cents. Under a split fare plan the bus company would have to accept 3 cents as its share of co-ordinated service unless the federal court should approve some other division.

East St. Louis Railway Buys Business—Ends Dispute

Sale of three of the four buses operated by the Herzog Motor Transport Corporation of Edwardsville, Ill., to the East St. Louis & Suburban Railway, East St. Louis, has been announced. Until recently the Herzog line operated the buses between Edwardsville and Glen Carbon, but was enjoined by the Circuit Court from further operations on complaint of the railway. The bus company had failed to obtain a certificate of convenience and necessity from the Illinois Commerce Commission, although the bus line was several years old. The sale of the buses is believed to have ended the dispute. The railway proposes to operate a bus line between the two towns, while F. W. Herzog, president of the motor corporation, will charter his single remaining bus to special parties, without a fixed schedule. He does not need a state certificate to use a bus in that manner.

Another Promise on New York Bus Matter

Mayor Walker of New York said on Dec. 13 at a meeting of the Board of Estimate that he expected the board to agree on the award of bus franchises, 116 applications for which are pending, not later than Jan. 15. The Mayor explained afterward that he had meant that the board by that time would agree not only on a policy as to whether bus operation should be borough-wide or city-wide, but also on the applicant or applicants to whom the franchises would be awarded.

According to one commentator the Mayor's announcement was interpreted at City Hall as indicating that there had been at least a tentative agreement between the Mayor, who has favored city-wide operation, and Comptroller Berry and most of the borough presidents, who are believed to have favored making separate awards for each borough.

Express Service Between Oakland and Berkeley

Express railway service between Oakland and Berkeley via Telegraph Avenue, supplemented by the operation of buses, which will make all stops, was set by the Key System Transit Company for Jan. 3 following receipt of word that its fleet of fourteen new buses would be ready for operation at that time. The new service will reduce by 25 per cent the present running time between Fourteenth Street, Oakland, and University Avenue, Berkeley.

The fare will be 7 cents while universal transfers will be issued to all crosstown lines, and from the buses to the street cars and from street cars to buses. A person can board a bus at any corner and transfer to the through street car line or any crosstown line, or can board a through car and transfer to the bus if he wants to alight at any street between the station stops of the through street cars. Buses will not operate on Sunday, and on that day the present street car service will be maintained.

New Coach Service Begun in Atlanta

Atlanta's ten new single-deck coaches were placed in operation on Dec. 1 on the Morningside and Virginia-Highland lines. They are equipped with every modern safety device and appliance to improve riding comfort. These include four-wheel hydraulic brakes, 7½-in. balloon tires, deep, leather-upholstered seats, ample ventilation facilities, tested heating systems and adequate lighting arrangements. Like the double-deck coaches placed in service last year, the new coaches are painted in a flamingo red and cream color scheme. Entrance and exit are by the front door, which is operated mechanically by the coach driver. The single-deck coaches do not replace the double-deckers, as the larger coaches will continue in service during the rush hours, but simply are providing a supplementary service which already is proving very valuable to patrons of both lines.

Financial and Corporate

New Financing for Brooklyn City Approved

The stockholders of the Brooklyn City Railroad, Brooklyn, N. Y., approved on Dec. 7 a plan to create a new general and refunding mortgage of unlimited amount and the issuance of $2,500,000 of the bonds at the present time. As first drawn the plan contemplated the use of stock purchase warrant in connection with the bonds, but the bonds will be sold without the stock purchase warrant. Under the terms of the resolution adopted up to $18,000,000 of bonds may be issued for general and refunding purposes on the present properties. Any further issue of bonds, however, must be secured by new properties.

Directors are empowered to issue bonds from time to time without the stockholders' consent and to give stock purchase warrants or make future bond issues convertible into stock. No action was taken on the plan to increase the capital stock. This remains at $16,000,000. Funds received from the sale of the present issue of $2,500,000 will be used, it is said, for the purchase of cars, the redemption of car trust certificates and other corporate purposes.

New Firm to Deal in Utility Securities

Stone & Webster, Inc., and Blodget & Company announce the formation of a new company under the name of Stone & Webster and Blodget, Inc. The corporation is a combination of the securities department of Stone & Webster, Inc., and the old investment house of Blodget & Company. The engineering and construction, management and investigating departments of Stone & Webster, Inc., are not included and will not be affected by the combination.

Bayard F. Pope, now a partner of Blodget & Company, will be president of the new corporation. Other officers and the directors will be drawn from both the participating companies, all the present partners of Blodget & Company being officers of Stone & Webster and Blodget, Inc.

Public utilities and others whose securities will be handled by Stone & Webster and Blodget, Inc., will have the advantage of a wider market through the combination than either of the companies could offer separately. Its facilities will be available not only for originating issues to be sold by the new house exclusively, but also to public utilities and other corporations in the sale of whose securities Stone & Webster and Blodget, Inc., will participate with other houses.

While the new corporation will be operated in an entirely independent capacity, it will have at its elbow the comprehensive engineering and construction and analysis service of Stone & Webster, Inc.

The officers of Stone & Webster and Blodget, Inc., in addition to Bayard F. Pope, president, will be: C. E. Ober, H. R. Hayes and R. H. Carleton, senior vice-president; T. T. Whitney, Jr., P. L. Warren, J. D. Thomas, R. H. van Deusen, A. C. Dunmore, J. E. Baker and A. B. Griffin, vice-presidents; F. T. Pratt, secretary, and Howard F. Neill, treasurer.

The new company will begin operation on Jan. 1, 1927, at 120 Broadway, New York.

New Chicago "L" Issue Approved

Stockholders of the Chicago Rapid Transit Company, the elevated lines, on Dec. 9 approved an increase in the authorized prior preferred stock of the company from $5,000,000 to $10,000,000. The new issue of stock has been approved by the Illinois Commerce Commission. It is the intention of the directors to issue only $1,500,000 at this time, to be sold through the Utility Securities Company. The new stock will pay a return of 7.2 per cent or 60 cents a share a month, instead of the 65 cents a month a share being paid on the present outstanding prior preferred, sold several years ago to employees and the public. In a notice sent with the latest dividend check to its passenger and employee partners the management said:

> The lower rate of return of the new stock emphasizes the value of the present outstanding stock as an investment. The present stockholders should hold on to their holdings, because they will find it difficult to get an investment as reliable which pays as high a rate of return. The new rate of 7.2 per cent is a good return on a stock that is as safe as the prior preferred of the Rapid Transit Company. Shareholders who desire to increase their holding may make application now for the new stock to the Utility Securities Company.

The proceeds of the new issue of stock are to be used to meet capital expenditures for improvements and extensions to permit of the company doing a larger business. The money derived from the last stock sale was used for the purchase of new cars, for platform extensions and other capital expenditures which greatly enhanced the value of the properties.

$4,656,000 Boston Elevated Issues Authorized

The Department of Public Utilities of Massachusetts has approved issuance by the Boston Elevated Railway two issues of bonds. The first totals $2,700,000 to be put out on Feb. 1, 1927, at not more than 5 per cent or not longer than twenty years to refund West End Street Railway bonds maturing on that date. The second totals $1,956,000 for the same period and with the same interest rate to be put out May 1, 1927, to retire the same amount of West End Street Railway bonds maturing then. The indentures by which these two issues will be secured will carry the provision for calling the bonds at 101 after the expiration of two years from the date on which they are drawn.

Another Hearing on Albany Fares

In figures submitted by the United Traction Company, Albany, N. Y., at the Nov. 30 hearing before the Public Service Commission on the petition of the company for a 10-cent fare it was brought out that the company had a net operating income of $261,955 on its entire system for the nine months of 1926. Operating losses of $21,552 in Troy and $2,173 in Rensselaer were claimed by the company. General Manager Murphy said that the net operating revenue of $222,496 shown in the comparative figures for Albany was virtually eliminated when fixed charges were deducted.

An adjournment was taken until Dec. 15 to enable the commission and city authorities to go over the data. John E. MacLean, general counsel of the company, said he would submit figures on behalf of the Capitol District Transportation Corporation separately, although the problems of the bus and trolley lines were much the same. The Capitol District Transportation Corporation, the bus operating subsidiary, has a similar petition pending.

Immense Refunding Issue by Indiana Company

Retirement of seventeen issues of securities, varying in amount from $11,000 to $1,834,300, by the Interstate Public Service Company, Indianapolis, Ind., will be effected through an issue of $10,000,000 of first mortgage and refunding 5 per cent bonds which the company has sold to a banking syndicate. Nine of the issues which are being retired carry a 5 per cent interest coupon, one 5½ per cent, five 6 per cent, one 6½ per cent and one 7½ per cent.

In addition to providing for the retirement of these bonds, proceeds of the new issue will be used for additions and extensions to the property of the corporation, which is controlled by the Middle West Utilities Company.

Balance in Detroit Increases

For the year ended Nov. 30, 1926, the City of Detroit, Department of Street Railways reported railway operating revenue of $22,788,523 against $22,246,735 for a similar period of the year previous. The coach operating revenue was $2,023,802 and $702,596 for this year and last year respectively. The total revenue from all sources was $25,075,554 against $23,132,562 for the year ended Nov. 30, 1925. Total operating expenses were $19,142,015 against $17,060,802. In these two figures are included coach operating expenses of $1,959,592 and $673,299 for the years ended Nov. 30, 1926, and Nov. 30, 1925. Net revenue was $5,933,539 against $6,071,670 in November, 1925. The net income was $3,243,243 for this year compared with $3,440,529 for a year ago. The balance for the period was $638,063 against $562,741 for a similar period last year. Railway passengers carried in 1926 totaled 489,726,807 and 477,412,178 in 1925. The total number of passengers carried on the coaches was 25,804,419 this year against 9,435,872 for the year ended Nov. 30, 1925.

Receivers Named for Chicago Railways

Friendly Action Brought to Preserve Integrity of Company and Avoid Chaos and Confusion—Statement by Directors—Other Recent Moves Reviewed

THE Chicago Railways, the so-called west and north side surface lines, were placed in receivership on Dec. 15 by Federal Judge John H. Wilkerson. The petition for this action came from the Westinghouse Electric & Manufacturing Company, which represented that it had demanded $67,075 in payment for electrical equipment for a substation and that payment had been refused. It asserted also that the funded debt of the company, totaling $103,228,265, will fall due when the company's franchise expires on Feb. 1, 1927, and that this obligation cannot be met. To conserve the interests of every one it was urged that the company and all its assets and earning power be put into judicial custody. The Chicago Railways, operating in coordination with the Chicago City Railway, constitutes the Chicago Surface Lines.

The company through its lawyers admitted all the allegations and Judge Wilkerson appointed these three receivers: John J. Mitchell of the Illinois Trust Company, Frederick H. Rawson of the Union Trust Company and Henry A. Blair, president of the company.

The court authorized the lines placed under its protection to continue unified operation with the "city" system. This means the same service as at present with transfers and the same fares. For several years Chicago's Surface Lines have been charging a 7-cent fare. On the elevated lines the fare is 10 cents.

Protection of Law Needed

In explaining the reasons for the receivership the directors of the Chicago Railways pointed out that the only way in which the company can provide for the obligations which will become due on Feb. 1 is the continued operation of the system and that the only way this can be assured is by placing the company's property under judicial protection.

No arrangement with the city for continuance of service after the expiration of the franchises could be carried out, it is declared, if the holders of overdue bonds should bring suits, obtain judgments and issue executions against the property.

"Seeing no way," the statement of the board of directors says, "by which to avoid the chaos and confusion which would result in local transportation if the properties were not in judicial custody when the many millions of indebtedness evidenced by bonds falls due on Feb. 1—in other words, believing a receivership to be inevitable in order to give authoritative assurance that efficient street car service can be provided—the directors authorized and directed counsel for the company to join in the application that the court take the properties into judicial custody to the end that the system may be kept intact and thus able to provide service to the car riders without interruption."

John J. Mitchell of the Illinois Merchants' Trust Company, speaking for the receivers, said:

"In accepting appointment as one of the receivers it is with the hope that the receivers may be able to render a public service by bringing about between now and Feb. 1 concurrence among all interests in all street railway properties in some plan or arrangement which the city authorities might approve whereby for some reasonable period following Feb. 1, 1927, and without prejudice to any right of the city or to any interests in any of the properties, there may be continued the unified operation of all the surface lines with like effect as regards service to the public as though all such lines were owned and operated by one company.

"With the present unified service assured until Feb. 1 the immediate task of the receivers will be to work out if possible some plan, arrangement or understanding for the continuance after Feb. 1 of unified operation of the separate street railway properties in such a way that the city authorities may assent thereto without in any way prejudicing any of the rights of the city during the interval until a permanent solution of the traction problem is reached."

City Council Authorizes Six-Month Franchise Extension

An hour after the receivers had been appointed the City Council voted to authorize its local transportation committee to negotiate a six-month extension of the franchises of the railways. So many questions of a legal character were asked by the Aldermen that Mayor Dever said:

> This is a critical situation. I have practiced law long enough to know that this is the time to ask the corporation counsel to think—not to talk. I hope you will not ask questions involving complicated legal questions, but rather confine your questions to those which are essential for you to get information upon which to cast your votes.

Aldermanic questions indicated that the Councilmen desire the law department to ask the federal court to compel the receivers to continue to pay 55 per cent of the railway's net receipts to the city, pave its right-of-way as the franchise stipulates, clean the streets and perform other obligations which it assumed in accepting the franchise.

Later in the week the Mayor charged that the receivership was part of a plot to defeat Chicago's administration plan to unify local transportation facilities and give the citizens a fair traction deal. He made this statement at a meeting of the Conference on Home Rule for Public Utilities called by the Illinois municipalities.

While the Mayor was speaking Leonard A. Busby, president of the Chicago City Railway, in a letter to Alderman McDonough, chairman of the committee on local transportation, announced that his company would accept a six months extension of the present traction ordinance, which expires on Feb. 1, 1927.

Corporation Counsel Busch promised the Council sub-committee on traction that on Monday or Tuesday he would file an intervening petition in the federal court to assure full protection of the city's rights in the receivership under the 1907 traction franchise ordinances.

A very brief recapitulation of some of the salient points in the local traction situation follows:

1. Franchises of companies whose properties are operated by the Chicago Surface Lines, largest street railway system in the world, expire on Feb. 1. These companies are earning a good margin of profit, but one of them has already gone into the hands of receivers.

2. Bankers interested in Surface Lines' securities have formed protective committees for practically all classes of security holders, and seem disposed to await events on and after Feb. 1 before taking further action.

3. F. J. Lisman, New York, has submitted a plan for refinancing of the Surface Lines' properties which has met with the opposition of the protective committees.

4. Chicago Motor Coach Company has offered to replace street cars with buses, which raises the question of what will be done in that event with the present properties and their security holders.

5. The City Council has made several attempts to deal with the problem, which thus far have come to nothing, apparently because of the gap between ideas as to what is financially and what is politically advisable. A proposal that expiring franchises be extended six months is still under consideration.

6. The State Legislature does not meet in time to deal adequately with its part of the problem. Chicago will probably present little opposition to a bill permitting the granting of terminable franchises to the railways, but will undoubtedly object to state control thereof, especially in matters of service.

7. Chicago has at present an uncoordinated local transportation system composed of surface lines, elevated railroad and buses. Co-ordination of these facilities, with the possible construction of a loop subway, would greatly aid the development of the city and its metropolitan district.

Praise from a Financial Authority

THE bankers who have been identified with the Chicago Surface Lines for twenty years have formulated no plan for reorganization. With the earning power of the properties great as it is there should then be no difficulty in arriving at a sound financial plan. The Chicago Surface Lines are almost unique among street railways in the steady growth of their earnings. They carry annually about 850,000,000 passengers. The increase in passengers carried and in gross revenues this year is running better than 4 per cent above 1925.

Physically the property is exceptionally fine, it gives good service and has a substantial degree of public good will. The companies have been successful in obtaining reasonably remunerative fares from the courts, the value of their properties has been established beyond possibility of question. Even the city's appraisers have found actual value in excess of the "purchase price" established by the present ordinance. During the present régime millions of dollars have been collected in depreciation funds to meet heavy renewals that may be necessary some years hence.—*Barrons.*

Merger Talk Again in Washington

The Public Utilities Commission of the District of Columbia has adopted the bill designed to induce the Washington Railway & Electric Company and the Capitol Traction Company to merge voluntarily. Enactment of the measure will be sought at the coming session of Congress.

Stripped of its verbiage, the measure contains three rewards for the companies if they consolidate and a heavy penalty in the form of a 50 per cent increase in the gross revenue tax if they fail to do so by July 1, 1928. The rewards are a guaranty against unlimited bus competition, repeal of the crossing policeman tax and repeal of the bridge repair tax.

Members of the committee explained that the bill is very similar to the joint proposals of the railways submitted several days ago, except that the objectionable service-at-cost plan, based on an agreed valuation, is removed. The commission bill also ignored the request of the companies that they be relieved from any obligation to pay the cost incident to the laying of new pavements for the permanent improvement of streets or highways utilized by them.

The commission decided to transmit the outline of the merger plan submitted by the railways to Congress, together with its merger bill, so that it may have independent consideration.

Acquisition of the Washington Rapid Transit Company by the North American Company was a violation of the public utilities act, William McK. Clayton, special legal adviser to the Public Utilities Commission, held in an opinion submitted to the commission. Mr. Clayton held that no other utility in the District and under the control of the commission offended the act of Congress by acquiring and holding the stocks and bonds of another public utility corporation without first securing the consent and validation of either Congress or the commission to such purchase and holding. Mr. Clayton warned the commission that should a merger of the street railway companies fail to be consummated "a very grave question" might arise as to the legality of the holdings of the North American Company in the Washington Railway & Electric Company and the Capital Traction Company.

The purchase of the Washington Rapid Transit by the North American Company, Mr. Clayton said, "seems to be the first instance" in the commission's fourteen years of control "where a public utility submitting to its jurisdiction desiring to buy or sell the stock or bonds of another public utility did not first apply for the consent of the commission to such purchase or sale."

Abandonments in Oswego Sought

Five petitions were filed with the Public Service Commission on Dec. 9 by the Empire State Railroad Corporation asking for approval of the abandonment of certain railway lines in the city of Oswego, N. Y. The petition states the directors of the railroad adopted a resolution on Oct. 26 in favor of the abandonment of the railway on five different lines and that this resolution was adopted in a stockholders' meeting on Dec. 3. The petition further stated that the receipts from the electric lines on these routes did not meet operating expenses. This loss in conjunction with losses upon other routes in the city of Oswego was so great as to impair the solvency of the petitioner and threatened to destroy its ability to furnish railroad service of any kind over any of its lines. The commission will hold a public hearing on the application.

Long Receivership to Be Lifted

Property of Second Avenue Railroad, New York, to Be Sold Jan. 13—Reorganization Terms Reviewed

A plan to bring the Second Avenue Railroad, New York, out of receivership was made public on Dec. 15 by the committee representing holders of the road's receivers' certificates. It is proposed to buy the road at auction on Jan. 13 and then to form two corporations to control severally the real estate and railway properties of the company.

The proposed real estate corporation would have a bonded indebtedness not to exceed $750,000 secured by a first mortgage on the carhouse property and a capital issue of 31,400 shares of no-par stock. This lien would be placed on the land and improvements only to the extent necessary to meet cash requirements in the event that such funds were not provided by the consolidated mortgage bondholders. The stock would be exchanged for receivers' certificates in the ratio of ten shares for each $1,000 certificate.

The proceeds of the first mortgage loan, if placed on the property, would be used to the extent necessary to purchase an amount of the proposed railway corporation's first lien 6 per cent thirty-year bonds to provide cash for the latter corporation's operation. If the committee was able to bid in the road at a price within the amount of the certificates found to have been expended in preserving and operating the road, the amount of the first mortgage loan would be confined to cash requirements. The statement says:

> The committee has been conferring with representatives of the consolidated mortgage bondholders on sundry proposals looking to the providing by them of the "cash requirements" in exchange for an interest in the railway corporation. This would save the carhouse property for the certificate holders free from lien. The principal obstacle has been the difficulty of arranging a contract to obtain power for operation. There is still a possibility that the consolidated mortgage bondholders will provide said "cash requirements."

The proposed railway corporation would acquire the property, rights, interests and franchises, exclusive of real estate. It would have a bonded indebtedness not to exceed $750,000 of first lien 6 per cent 30-year bonds, and a capitalization of 31,400 shares of no-par stock. This stock would be exchanged ten for one for certificates in the event that cash requirements were met by a mortgage on the real estate. However, if they are met by bondholders, this stock would be divided between bondholders and certificate holders in amounts to be determined by the committee.

The Second Avenue Railroad operates 26 miles of conduit railway in the Borough of Manhattan. The road has been in the hands of receivers since 1908. This is one of the longest receiverships on record.

Helena Properties Sold

Properties of the Helena Railway, Light & Power Company, Helena, Mont., were sold on Dec. 1 for $584,500, under foreclosure proceedings, to the bondholders' committee, represented by C. M. Clay of the law firm of Simpson, Thayer & Bartlett of New York.

The plan proposed for the reorganization contemplates the segregation of the railway properties from the light properties. Two separate companies will be formed, one to take over the railway and the other to take over all of the activities of the company other than those performed by the railway. Holders of certificates of deposit under the agreement dated July 30, 1925, who assent to the plan will receive for each $1,000 bond $600 in 6 per cent bonds of the electric company and $400 in cash, together with an amount of cash equivalent to interest at the rate of 5 per cent per annum upon 60 per cent of the principal amount of the old bonds from Sept. 1, 1925, to the date from which the new bonds bear interest and upon 40 per cent of the principal amount of the old bonds from Sept. 1, 1925, to the date to be selected by the committee for the distribution of the new bonds and cash to the holders of the certificates of deposit.

The electric company is to make an issue of 25-year 6 per cent bonds to be issued under and be secured by a mortgage constituting a first lien upon all physical assets and franchises of the electric company then owned and thereafter acquired and also upon the stock of the railway. The initial issue of bonds is to be $750,000.

Another Step in Disposition of Rockford Properties

Charles J. Horn, Milwaukee, Wis., bought the physical properties of the Rockford, Beloit & Janesville Electric Railway, Rockford, Ill., at a foreclosure sale on Dec. 9 in that city for $52,000. Mr. Horn was the only bidder. He bid in the property according to an arrangement under which it is expected T. M. Ellis, Jr., Beloit, will become the owner of the line within 60 days. The present sale relates particularly to the Rockford, Beloit & Janesville Electric Railway, formerly included as a part of the Rockford & Interurban Railway system.

Napa Valley Road Reported Sold

Rumor persists of the sale of the San Francisco, Napa & Calistoga Railway (electric) to the Western Pacific Company. The rumor has been strengthened by the reported sale of the Sacramento Short Line to the Western Pacific. It is generally known that the Napa Valley road has recently defaulted in interest payments on its

bonds. Control of the road is held by James Irvine, Seattle. Its tracks connect Vallejo with Calistoga, and it reaches San Francisco through a traffic agreement with the Monticello Steamship Company.

New York City Companies Would Consolidate

A joint petition of the Eighth Avenue Railroad and Ninth Avenue Railroad, New York, has been presented to the Transit Commission praying that the commission authorize the petitioners to merge and consolidate the capital stock, franchises and property of each petitioner pursuant to a joint agreement duly entered into by them, so as to form one corporation under the name of "Eighth & Ninth Avenues Railway."

States Condition of Former Railway Property.—The Denver & South Platte Railway, which until last May operated tramcars between Littleton and Englewood, Col., recently advised that all physical property had been removed from the right-of-way and sold in accordance with authorization from the Public Utilities Commission.

Worcester, Too, Accepts New Haven Control.—The committee on streets of Worcester, Mass., formally accepted the ruling of the 1926 Legislature that the New York, New Haven & Hartford Railroad be permitted to resume control of the Worcester Consolidated Street Railway. The matter was taken up to answer a petition of the New Haven road to the City Council that it be allowed to take over and control the holdings in accordance with the wishes of the city. The City Council and Mayor O'Hara favor the arrangement.

Opportunity Given to Buy Shares.—An opportunity is afforded the patrons and employees of the Winnipeg Electric Company, Winnipeg, Canada, to become partners of and share in the earnings of the railway. The company is offering 2,500 shares of its 7 per cent cumulative preference stock. The shares are offered to company employees at par, $100 per share, and may be bought for cash or on partial payments of $10 cash and $10 per month per share. In order to give a large number of customers and employees the opportunity to participate, the company is limiting the number of shares to any one person to 50. The sale will close on Dec. 23.

Approval Sought for Intercompany Financing.—The San Francisco-Sacramento Railroad, Oakland, Cal., has applied to the Railroad Commission for authority to execute a mortgage in favor of the Sacramento Northern Railway in the sum of $98,430. This will be payable in one year from date, with interest at 6 per cent, covering money borrowed from the mortgagee.

O. H. Wathen a Louisville Director.—O. H. Wathen has been elected a director of the Louisville Railway, Louisville, Ky. Mr. Wathen will replace W. S. Campbell, chief engineer and general manager of the Kentucky & Indiana Terminal Railroad, who resigned.

Personal Items

C. W. Wilson Research Manager

Pittsburgh Railways Designates Official to Head Important Activities —Many Years Experience

Clyde W. Wilson has been appointed by the Pittsburgh Railways, Pittsburgh, Pa., to the position of manager of the research department—a department which has been lately created for the purpose of rendering a service to the operating officials in the way of instruction concerning production and sales of railway transportation in other cities as well as complete and up-to-date information about all branches of the properties of the Pittsburgh Railways.

At the time of the reorganization of the company at Pittsburgh, Mr. Wilson was made assistant to the general manager and served in this capacity and as assistant to the vice-president until his appointment to head of the research department.

C. W. Wilson

The choice of Mr. Wilson for this position is particularly fortunate, his wealth of knowledge gained through years of experience both in electric railway and railroad transportation having fitted him thoroughly for this work.

The activities of his department range from investigations which may be so important as to indicate broad changes in policy or method to minute analyses of local operating cost. Information is secured by means of visits by the research manager and research engineer to other properties, through contact with associations, from trade journals, by maintaining a newspaper clipping service, from other companies direct, and from any other sources available.

Mr. Wilson was born near Covington, Ky., and was educated in the public schools and at Kentucky State College at Lexington. From 1902 until 1906 he worked for the Erie Railroad, the Cincinnati, Hamilton & Dayton, now part of the B. & O., and Chicago, Cincinnati & Louisville Railroad, now part of the Chesapeake & Ohio Railroad.

In 1906 he became associated with the Cincinnati Traction Company and served in various positions of the operating department until 1920, when he was asked to come to Pittsburgh to help Thomas Fitzgerald, at that time a consulting electric railway engineer and now vice-president of the company, in the work preliminary to the reorganization of the Pittsburgh Railways.

Changes in Personnel at Ludington

The Michigan United Light & Power Company, Grand Rapids, Mich., announces changes in personnel made since the recent formation of the Pitkin power group in Michigan. Under the new plan W. A. Wadsworth, manager of the southern territory since last March, has been made vice-president and general manager to direct the Michigan properties of the concern. His headquarters will be temporarily in Ludington, Mich., that he may supervise the management of the Ludington district.

Management of the Michigan Public Service Company at Sheboygan will be in charge of F. A. Swanson, Ludington, who will be succeeded as local superintendent by F. B. Swanson at Hart. C. L. Mosher will be plant engineer and load dispatcher for the state. He formerly was with the Consumers Power company at Jackson. C. G. Pitkin has been promoted from the Hart office to Ludington. Work in connection with the accounting and the construction activities of the company will be consoliated.

B. F. Pope Heads New Investment Firm

Bayard F. Pope has been elected president of Stone & Webster and Blodget, Inc., which will succeed on Jan. 1 to the securities department of Stone & Webster, Inc., and the investment house of Blodget & Company, as noted elsewhere in this issue. Mr. Pope has risen steadily in the investment banking field. After he was graduated from Harvard in 1908, he joined the Chicago banking house of Mason, Lewis & Company. This corporation was dissolved in 1910 and Mr. Pope joined Blodget & Company, by which he was charged with the responsibility of developing the New York office. Shortly after this country's entry into the war he enlisted for work in the publicity department of the Liberty Loan Committee, where, under Gov. Benjamin Strong, he did remarkable work as vice-director of publicity in charge of advertising, his department laying out the entire plan for liberty loan work throughout the country. He was made a partner in Blodget & Company in 1919. In addition to being president of the new company, Mr.

Pope is also a director in a number of other corporations, including Engineers Public Service Company, General Public Service Corporation, Virginia Electric & Power Company and New England Power Association.

Illinois Power & Light Purchasing Department Changes

Changes have been announced in the organization of the purchasing department of the Illinois Power & Light Corporation, Chicago, Ill.

Frank H. Hughes is appointed supervisor of purchases with headquarters at Chicago.

H. J. Vance is appointed purchasing agent for the Illinois properties of Illinois Power & Light Corporation, acting in that capacity both for the various Illinois divisions and for the Illinois Traction System. Mr. Vance also will have direct charge of the Decatur storehouse, and his offices will be located at Decatur.

J. A. Jefferis is appointed fuel purchasing agent with headquarters at St. Louis, having responsibility for the purchase of coal and other fuels for all the various state groups of the company.

G. M. Eaton with Molybdenum Corporation

G. M. Eaton, chief mechanical engineer of the Westinghouse Electric & Manufacturing Company, has identified himself in a sales engineering capacity with the Molybdenum Corporation of America.

With Westinghouse he soon associated himself prominently with railroad electrification problems and his success in that field is attested by his prominence in work associated with the mechanical features of electric locomotives for the Pennsylvania, the New York, New Haven & Hartford, the Norfolk & Western and the Chicago, Milwaukee & St. Paul Railroads.

In 1910 Mr. Eaton was appointed division engineer of the railway department, where the scope of his activities was widened. In 1919 he was made chief mechanical engineer of the Westinghouse company. Many inventions are accredited to him. They include developments in the field of complete locomotive design, motor mounting, motor details and overhead line construction. He will continue a curtailed association with the Westinghouse company in the capacity of consultant on mechanical engineering problems.

Changes in Kewanee

In line with the new plans for supplying current to the Kewanee Public Service Company, Kewanee, Ill., a change will be effected in the personnel. Jean DeCamp, superintendent of the railway system for the last two years, and Max Bertch, master mechanic, will leave soon for Texarkana, Tex., where they will join the Southwestern Gas & Electric Company, occupying positions there similar to the ones they held in Kewanee. E. T. Crocker, Quincy, has been transferred to have charge of the railway at Kewanee.

A. T. Spencer at Montreal

Former Toronto Official Becomes General Superintendent of Construction and Maintenance of Quebec Property

A. T. Spencer has joined the staff of the Montreal Tramways, Montreal, Que., with the title of general superintendent of construction and maintenance. Since May, 1924, he has been assistant to the general manager of the Toronto Transportation Commission, Toronto, Ont., operating the municipal electric railway there. Before that he was engineer of way of the Toronto Commission. As assistant general manager at Toronto he continued to supervise the operation of the way department.

Helped to Rehabilitate Toronto Property

Mr. Spencer was appointed to the important position of engineer of way of Toronto Transportation Commission in May, 1921, in anticipation of the extensive rehabilitation program which

A. T. Spencer

began when the commission took over the local lines the following September. This work might have been accomplished in a leisurely manner, but the idea of leisure in rehabilitating the property of the Toronto Railway did not enter into the thought of the Transportation Commission, appointed by the city to take over and operate the Toronto Railway and consolidate it with the lines then owned by the city. The city had suffered too long from bad tracks and poor cars and been inconvenienced in too many other ways to be at all tolerant of any program which countenanced dallying with the work in hand.

200 Miles of Track Rebuilt

As explained in the ELECTRIC RAILWAY JOURNAL for May 10, 1924, in the personal about Mr. Spencer at the time he was made assistant to the general manager at Toronto, quantity production methods were worked out for the reconstruction of nearly 200 miles of track, and the matter was handled so well under his direction and supervision that all of the work was done during two seasons. In order to carry out this work successfully in the very short space of time in which Mr. Spencer accomplished it, he had to resort to many novel methods and to exercise a great deal of ingenuity.

Mr. Spencer brought to the work which he did at Toronto a fund of information gained while serving with other railways and while engaged in other similar lines of work. For a few months prior to his appointment under the Toronto Transportation Commission in May, 1921, he acted as assistant engineer in the railway department of the Hydro-Electric Power Commission of Ontario. Before that he had been connected with the Montreal Tramways, first as assistant engineer in charge of maintenance of way and later as chief engineer of this department. Previous to that he was employed by the Canadian Pacific Railway on grade revision in New Brunswick, Quebec and Ontario. In 1907 he was appointed assistant engineer of the Montreal Park & Island Electric Railway, and it was from this company that he went to the Montreal Tramways.

Mr. Spencer entered upon his engineering career in 1901 with the Dominion Coal Company and the Sydney & Louisberg Railway. He was born in Nova Scotia and there received his general and technical education. In all the work that he has done Mr. Spencer has shown a remarkable capacity for carrying out the job efficiently.

Active in Association Work

He is a member of the standing committee on way and structures of the American Electric Railway Engineering Association and is chairman of the special committee of that association appointed to study the use of alloy steels, other than manganese, in special trackwork. He is an associate member of the Engineering Institute of Canada, a member of the Association of Professional Engineers of Quebec, a member of the Association of Professional Engineers of Ontario and a member of the American Society of Municipal Improvements.

A. P. Way, formerly assistant electrical engineer of the American Electric Power Company, successor to the American Railways, Philadelphia, is now assistant engineer in the electrical division of the Department of City Transit at Philadelphia. He was connected with the Wilmington & Philadelphia Traction Company, a subsidiary of the American Electric Power Company, immediately before taking his present position.

Roy L. Zinstine has been appointed supervisor of safety and first aid of the electrical department of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio. This is a newly created position. In 1921 Mr. Zinstine went to the Pennsylvania-Ohio system as a truck driver in Youngstown. He was one of the 26 employees who elected to take the Red Cross first aid training in the institute organized by Dr. Redden.

R. G. Soper has been elected treasurer of the Southwestern Public Service Association, Dallas, Tex. For many years Mr. Soper was active in the manufactured and later the natural gas industry. He was also secretary of the Dallas Gas Company.

W. G. Holmes has been appointed industrial agent for the Interstate Public Service Company, Indianapolis, Ind. Mr. Holmes was connected with the Indianapolis Chamber of Commerce at the time of his appointment. He is a graduate of Colgate University, where he specialized in mathematics, engineering and economics and where he served as assistant instructor in engineering two years prior to his graduation. From September, 1925, to March, 1926, he was with the Bureau of Business Research at Indiana University. As industrial agent of the Interstate he succeeds the late Anderson G. Moore.

R. M. Vaughan, who has been in charge of valuation work in the engineering department of the California Railroad Commission for a number of years, has resigned to engage in private practice.

B. M. Lathrop recently retired as general superintendent of the Colorado Springs & Interurban Railway, Colorado Springs, Col. He had been associated with the company for the past 25 years.

A. E. Haak has succeeded B. M. Lathrop as general superintendent of the Colorado Springs & Interurban Railway, Colorado Springs, Col. For some time he has been purchasing agent of this company. He will continue in that capacity.

J. J. Flynn has been appointed general storekeeper for the Chicago Rapid Transit Company, Chicago, Ill., succeeding R. R. House, who was recently promoted to general superintendent of stores for the four electrically operated railroads under the management of the Insull interests. Mr. Flynn has been an employee of the Chicago Rapid Transit Company for fourteen years.

Francis J. Gannon has resigned as assistant treasurer of the Northern Texas Traction Company, Fort Worth, Tex., to take over the duties of assistant treasurer and secretary of Davis Islands, Inc., a development at Tampa, Fla., under Stone & Webster management. He had been assistant treasurer of the Northern Texas Traction for the past ten years. More recently he had also been handling the advertising for the company. A. A. Chamberlain has succeeded Mr. Gannon as assistant treasurer.

Dr. W. B. Coffey, chief surgeon of the Market Street Railway, San Francisco, Cal., for almost 25 years, resigned as head of the medical department to become chief surgeon and general manager of the Southern Pacific Hospital System.

Charles H. McEachron has recently been appointed superintendent of the Tacoma Municipal Belt Line, Tacoma, Wash. He succeeds in this capacity A. Gunderson. Reconditioning of the rolling stock of the belt line will be undertaken at once by the newly appointed superintendent, it was stated by Mayor M. G. Tennent. The appointment is temporary, it is said. Mr. McEachron has been foreman of the machine shop of the Tennent Steel Casting Company, of which Mayor Tennent is the head, for the last three years.

James Dalrymple Retires

Glasgow Manager with World-Wide Reputation Will Relinquish Post After 46 Years of Service

James Dalrymple, general manager Glasgow Corporation Tramways, Glasgow, Scotland, recently intimated to the tramway committee of the corporation that he is prepared to retire from his position. The information was conveyed to the committee in the course of a discussion on a proposal that a considerable number of tramway employees who were dismissed by the manager because of their action during the general strike in May last should be reinstated. This proposal had come before the committee on previous occasions, and Mr. Dalrymple was firm in his attitude that as regards the particular men he would not take them back. In this he was supported by the majority of the committee and the Council. Despite this indorsement of him, Mr. Dalrymple decided that, taking all the circumstances into consideration, it would be inexpedient for him to carry on. He therefore intimated that he now proposed to exercise, as he was entitled to do under the corporation's scheme of superannuation, the option he had of retiring. He added that he wished to be relieved of his duties Dec. 31.

In all this politics has played its part. At a recent municipal election the socialist party gained a number of seats, and though the socialists are still in a minority, their number is now nearly as great as that of the moderate party. It is said that some of the latter were absent from the meeting of the committee on Nov. 18 so that the socialists had a small majority and carried their motion for reinstatement. Meanwhile Mr. Dalrymple had sent in his notice of willingness to retire. A small committee was appointed to consider the terms on which the resignation would be accepted.

Mr. Dalrymple has been in the service of Glasgow Corporation for 46 years. He was originally in the accounting department. When the tramways were municipalized in 1894 he became tramway accountant, and in 1902 he was appointed deputy general manager. Some two years later when the late John Young, then general manager, resigned in order to take a similar position with the Metropolitan District Railway, London, Mr. Dalrymple was appointed general manager. That post he has held since with conspicuous ability and success, both as regards the operating and financial sides of the undertaking. Under him the Glasgow Tramway has not only maintained its position as one of the successful undertakings of its kind in Great Britain, but has enhanced its position.

Mr. Dalrymple has visited the United States from time to time to study traffic conditions. On one memorable occasion when he was called in to advise, he strongly opposed the municipalization of railways in Chicago. By means of personal inspection he has also mastered street transport conditions on the Continent of Europe. Two years ago he went on invitation to Bombay, India, to advise as to the tramway development in the city. During the war he raised a battalion from among the Glasgow tramway employees in one day, and others followed. For these and other services during the war he received the C.B.E. decoration.

It was through Mr. Dalrymple's successful efforts during the general strike in May last to maintain tramway service in Glasgow by the engagement of volunteers that he incurred the enmity of socialists in the Town Council. The hostility thus aroused against him has been intensified by his subsequent refusal to reinstate certain strikers. It appears that he was willing to consider applications from some of them in the event that vacancies arose but he would not agree to reinstatement of the men en masse at present.

P. E. Dufour has been appointed valuation engineer of the California Railroad Commission, effective Jan. 1, 1927, to succeed R. M. Vaughan, who recently resigned from the service of the commission. Mr. Dufour has been with the transportation division of the commission's engineering department since March, 1921, at which time he was employed to make an extensive check of the federal valuation of the steam railroads in California. He has handled the valuation work on several of the large investigations made by the commission. Previous to his employment by the state Mr. Dufour was associated for six years with the bureau of valuation of the Interstate Commerce Commission. In addition to this work he has had considerable railroad experience, having been employed a number of years with the Southern Pacific Company, six years of which time he was assistant engineer in charge of railroad construction in California and Oregon. He was graduated in 1904 from the Van der Naillon School of Engineering.

B. P. Shearon has been elected secretary of the Northern Indiana Public Service Company, Hammond, Ind. He succeeds W. D. Boone, who has resigned because of illness. Mr. Shearon has been connected with the company for nineteen years. He formerly was comptroller of the company and for the last two years has been assistant secretary and assistant treasurer.

Obituary

Joseph Alvin Reckard, for 26 years cashier of the Los Angeles Railway, Los Angeles, Cal., died recently. Mr. Reckard was 66 years old. Prior to his going to the Los Angeles Railway in 1900 he was agent for the Toledo, Peoria & Western Railway at Fairbury, Ill.

Frederick G. Orcutt, assistant paymaster of the Connecticut Company at Hartford, Conn., died on Dec. 2 at his home in that city. Before going to the Connecticut Company he had been employed in similar capacities by the Boston & Maine and the New York, New Haven & Hartford Railroads. Mr. Orcutt was born in 1862.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Big Car and Bus Purchase Program at Atlanta

Ten new single-deck coaches have been placed in service by the Georgia Railway & Power Company, Atlanta, Ga. Purchase of the new coaches raises still higher the record of new transportation equipment purchased during the year, a mark which already had eclipsed any previous year in Atlanta's history. In addition to the ten coaches, the company has purchased and placed in service during 1926 60 new street cars for city lines and ten new de luxe interurbans for the Atlanta Northern and Stone Mountain lines.

Westinghouse Gets Big Order in Brazil

Award of a contract from the Paulista Railway in Brazil for the extension of that road from Rio Clare to San Carlos, a distance of 42 miles, has been made to the Westinghouse Electric International Company. This contract includes complete transmission line equipment, catenary contact system, together with necessary substation equipment and locomotives. The locomotives to be furnished will be duplicates of several built by the Westinghouse company and shipped to Paulista a few months ago. They represent the fourth order for that company to be placed with the Westinghouse company. The contract price for this present order is in the neighborhood of $1,500,000, it is reported.

M. J. A. Bertin Heads Galena Signal Oil

M. J. A. Bertin, who for several years has been in charge of the European business of the Galena Signal Oil Company, has been elected president and a director, succeeding L. J. Drake, who resigned to become president of the Union Tank Car Company.

Twin Cities Improvements Intimated

Improvements for 1927 to be made by the St. Paul City Railway, St. Paul, Minn., will cost about $350,000, with no definite outline yet made. A proposed new interurban line connecting the Franklin Avenue line in Minneapolis with the Rondo-Maria line would cost the St. Paul company $1,500,000, according to T. Julian McGill, vice-president of the Twin City Rapid Transit Company, and would require a larger fare. Otherwise construction of the line would not be possible for some years.

In Minneapolis the requests for railway extensions and improvements would, if carried out, cost the Minneapolis property $600,000 more than the fund available. In 1926 the outlay was $650,000, but for 1927 it will be less than this sum.

Oil-Electric Locomotive in Lumber Service

A new use for oil-electric locomotives has been found with the placing of a 100-ton unit of this type in service at Westwood, Cal., hauling logs from the woods to the mill of the Red River Lumber Company. The locomotive was built jointly by the American Locomotive Company, Ingersoll-Rand Company and the General Electric Company, and is similar in its general characteristics to other oil-electric units of the same tonnage which have been built for use by various railroads in the past years. The unit, which is operated by the Red River Lumber Company, is kept in daily operation over a 20-mile section of track.

Cold Facts at Disposal of Manufacturers

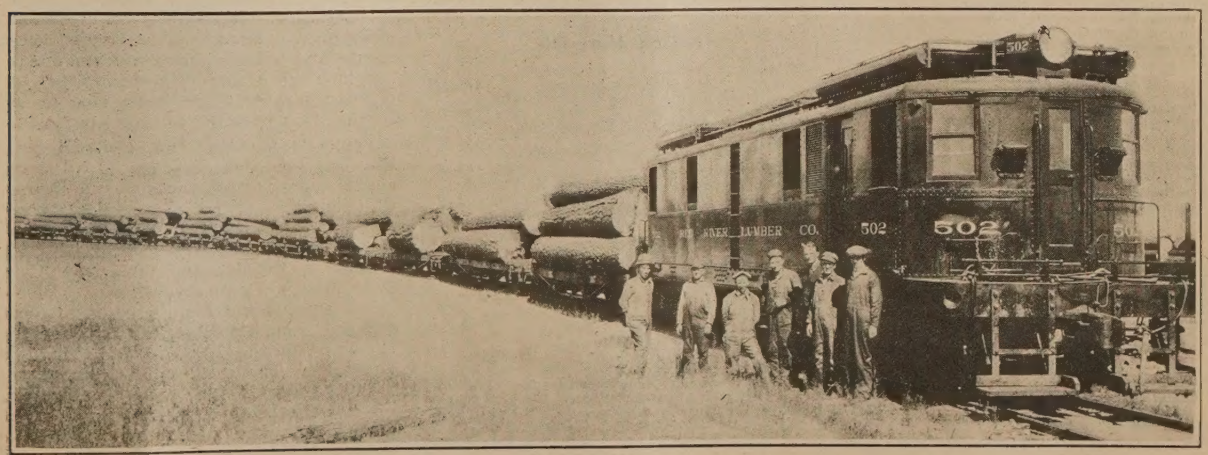
Discussion of Results Obtained with New Equipment Given by Charles Gordon at Cleveland Convention Ready in Booklet Form

Early in the week of the American Electric Railway Association convention in Cleveland last October a group of important electric railway manufacturers and their representatives gathered together at the invitation of James H. McGraw, president of the McGraw-Hill Publishing Company, Inc., to discuss various conditions affecting the purchase of new equipment in the industry. At this meeting Charles Gordon, editor of ELECTRIC RAILWAY JOURNAL, analyzed carefully the results which are actually being obtained by various properties which have shown a willingness to modernize their rolling stock. The questions of whether it costs less to buy new cars than to maintain old ones and whether the industry is actually paying for new equipment and then not getting it were answered in no uncertain terms.

So many requests were received by the JOURNAL for copies of Mr. Gordon's remarks that it was decided to publish them in booklet form for general distribution. Copies are being sent to manufacturers throughout the industry and an adequate supply of additional copies has been prepared for distribution to those who may request them. The booklet is illustrated with a number of charts which graphically portray the anomalous condition which is in existence at the present time and the common sense answer to the whole puzzling situation. It is hoped that this compilation of specific facts will prove of material assistance in the campaign to infuse new blood into the veins of the industry through the guise of modern rolling stock.

New Testing Laboratory for Delta-Star Electric

The Delta-Star Electric Company, manufacturer of unit type high-tension equipment, has constructed a new large testing laboratory in its plant at Chicago, Ill., for the use of its designing



Type of Load Hauled by This Oil-Electric Locomotive

engineers. The company feels that this will afford the means of securing the data necessary so that the equipment offered for sale will meet the severe conditions imposed by modern interconnection of the transmission system.

Included in the equipment of the laboratory are transformers, each of 250 kva. capacity and weighing approximately 18 tons each. They have primaries of 2,000 volts, secondaries of 250,000 volts and are arranged for the cascade or chain connection.

Excitation and control of the transformers is secured by a synchronous motor-generator set, the 2,000-volt winding of the first transformer being connected directly to the alternator. With three transformers in series there are 750,000 volts between the high-tension terminal of the third transformer and ground.

Another Instance of Manufacturer Co-operation

In mailing its recent dividend checks to stockholders, the Westinghouse Electric & Manufacturing Company expressed the hope that they would endeavor to ascertain the facts regarding local electric railway service and lend a helping hand toward establishing a favorable attitude of mind toward the electric railway. It said that this would result not only in better service for the people, and aid the prosperity of the stockholder's neighborhood, but would also benefit him as a part of the great Westinghouse organization.

The company said that the electric railway system of any city is a true mirror of the progressiveness of that community, for upon these transportation facilities, as a keystone, depend social and industrial progress. It then set forth these facts:

Since the establishment, 40 years ago, of the first transportation systems operated by electricity, this industry has made steady and healthy progress until today it represents an investment of $6,000,000,000 with securities held by 1,300,000 people; operates 105,000 cars and 50,000 miles of track; and carries more than 16,000,000,000 passengers annually.

Your company has been privileged to be identified with this basic public utility for the past 40 years and is in a particularly favorable position to appreciate the full value of its service and the importance of public understanding and co-operation.

For the past decade your company has endeavored to tell the public the facts and thereby to secure a better public understanding of the economic service rendered by the electric railways. This has been accomplished by a consistent program of co-operative advertising in the leading national popular media such as *Forbes*, the *Literary Digest*, *Scientific American*, *Collier's*, the *Nation's Business* and *Saturday Evening Post*, and in many financial papers.

In Special Publication 1751, "Electric Railways—The Keystone of Progress," are reproduced some of the most important of these advertisements. The 24 illustrated represent a combined circulation of 26,324,000, or in reality that number of individual messages delivered in behalf of the electric railway industry.

Large Equipment Order Placed by Long Island

Electrical equipment valued at approximately $700,000 is to be added by the Long Island Railroad. This expenditure will be made on equipment for 60 motor and 30 trail cars. The order calls for a duplicate of equipment previously purchased from Westinghouse by the railroad. Delivery is to be made in the spring to meet the requirements of heavy traffic. When the added cars go into operation the Long Island Railroad will have in service approximately 700 Westinghouse equipped motor cars.

Rolling Stock

Chicago, Aurora & Elgin Railroad, Aurora, Ill., is reported to be inquiring for fifteen additional interurban cars at the present time.

Utah Light & Traction Company, Salt Lake City, Utah, has purchased two 230-in. wheelbase Mack bus chassis, on which will be mounted Duralyte street car type bodies. The buses will be put in trolley feeder service between Bountiful and Centersville, an 8-mile route at a 20-cent fare. The schedule calls for eighteen trips daily.

Chicago, South Shore & South Bend Railroad, Michigan City, Ind., is making inquiries for ten motor cars and ten trailers.

Brooklyn City Railroad, Brooklyn, N. Y., expects to issue specifications about Feb. 1, 1927, for from 175 to 190 new cars. Since this matter was referred to originally in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 20, page 952, it has been decided that the new rolling stock will be similar to the cars now on the property, known as type 8,000. After these cars are delivered and older cars have been retired the company will have no cars in operation built earlier than 1920.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued a leaflet describing its new automatic welding head which provides automatic electrode feeding of the magnetic clutch type. The welding head and control are available either separately or as a part of a complete automatic welding equipment.

Ohmer Fare Register Company, Dayton, Ohio, describes its Odometer in a publication issued recently. This device is intended for application to electric and steam railway cars, trucks, buses and Drivurself cars. The company says that the Ohmer Odometer for railway service accumulates total mileage whether the car is going forward or backward. It requires no attention after once applied, and continuous, accurate and uninterrupted mileage reading are assured. When applied to railway service there is no change in the head or principles of its operation.

Pennsylvania Railroad, Philadelphia, Pa., has placed orders for 60 all-steel electric cars for suburban service in the Philadelphia district. The orders were distributed as follows: Standard Steel Car Company, 30; Pressed Steel Car Company, fifteen, and American Car & Foundry Company, fifteen. Electrical equipments for these units were ordered some time ago, as reported in the issue of the JOURNAL for Nov. 13, page 912. The cars will be placed in service early in 1928 upon completion of electrification between Philadelphia and Wilmington, Del., and Philadelphia and West Chester, Pa.

ELECTRIC RAILWAY MATERIAL PRICES—DEC. 14, 1926

Metals—New York

Copper, electrolytic, cents per lb.	13.375
Lead, cents per lb.	7.887
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.41
Tin, Straits, cents per lb.	68.625
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	63.00
General service	32.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$9.00
Somerset mine run, Boston	3.25
Pittsburgh mine run, Pittsburgh	2.75
Franklin, Ill., screenings, Chicago	1.875
Central, Ill., screenings, Chicago	1.725
Kansas screenings, Kansas City	2.35

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.35
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.20
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (24 gage), cents per lb.	3.00
Sheet iron, galvanized (24 gage), cents per lb.	3.85
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	11.40
White lead in oil (100 lb. keg), cents per lb.	14.00
Turpentine (bbl. lots), per gal.	$0.91
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	5.25–5.50

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire, cents per lb.	15.75
Rubber-covered wire, No. 14, per 1,000 ft.	$6.00
Weatherproof wire base, cents per lb.	17.50

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$142.40
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.94
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1 00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.85
Light copper, cents per lb.	9.25
Heavy brass, cents per lb.	6.50
Zinc, old scrap, cents per lb.	4.25
Lead, cents per lb. (heavy)	5.75
Steel car axles, Chicago, net ton	$17.25
Cast iron car wheels, Chicago, gross ton	14.75
Rails (short), Chicago, gross ton	16.50
Rails, (relaying), Chicago, gross ton	28.50
Machine turnings, Chicago, gross ton	6.75